50VL−A
Performance™ 14 SEER Single−Packaged Air Conditioner System with Puron® (R−410A) Refrigerant
Single and Three Phase
2−5 Nominal Tons (Sizes 24−60)

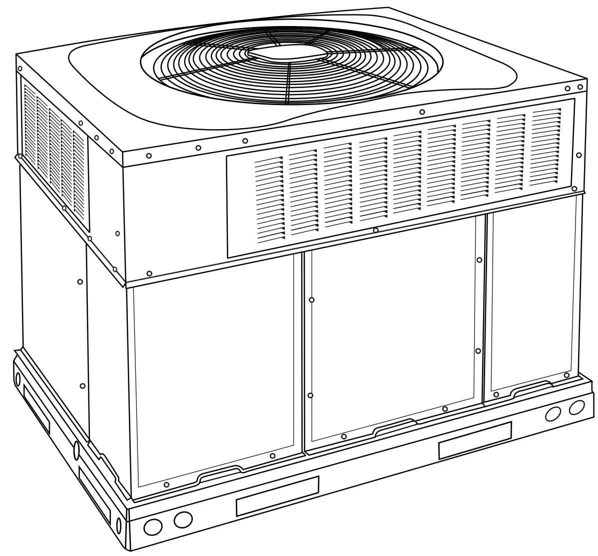
Carrier
turn to the experts

Installation Instructions

NOTE: Read the entire instruction manual before starting the installation.

NOTE: Installer: Make sure the Owner's Manual and Service Instructions are left with the unit after installation.

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A09033

Fig. 1 - Unit 50VL-A

SAFETY CONSIDERATIONS

Improper installation adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock, or other conditions which may cause death, personal injury, or property damage. Consult a qualified installer, service agency, or your distributor or branch for information or assistance. The qualified installer or agency must use factory-authorized kits or accessories when modifying this product Refer to the individual instructions packaged with the kits or accessories when installing.

Follow all safety codes. Wear safety glasses, protective clothing, and work gloves. Use quenching cloth for brazing operations. Have a fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions included in literature and attached to the unit. Consult local building codes, the current editions of the National Electrical Code (NEC) NFPA 70.

In Canada refer to the current editions of the Canadian electrical Code CSA C22.1.

Recognize safety information. This is the safety-alert symbol ⚠. When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury. Understand these signal words; DANGER, WARNING, and CAUTION. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which **will** result in severe personal injury or death. WARNING signifies hazards which **could** result in personal injury or death. CAUTION is used to identify unsafe practices which **may** result in minor personal injury or product and property damage. NOTE is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

Before installing or servicing system, always turn off main power to system and install lockout tag. There may be more than one disconnect switch. Turn off accessory heater power switch if applicable.

WARNING

PERSONAL INJURY AND ENVIRONMENTAL HAZARD

Failure to relieve system pressure could result in personal injury and/or death.

1. Relieve pressure and recover all refrigerant before servicing existing equipment, and before final unit disposal. Use all service ports and open all flow-control devices, including solenoid valves.
2. Federal regulations require that you do not vent refrigerant into the atmosphere. Recover during system repair or final unit disposal.

CAUTION

CUT HAZARD

Failure to follow this caution may result in personal injury.

When removing access panels (see Fig. 17) or performing maintenance functions inside your unit, be aware of sharp sheet metal parts and screws. Although special care is taken to reduce sharp edges to a minimum, be extremely careful when handling parts or reaching into the unit.

INTRODUCTION

The 50VL-A packaged air conditioner is fully self-contained and designed for outdoor installation (See Fig.1). See Fig. 2 and 3 for unit dimensions. All unit sizes have discharge openings for both horizontal and downflow configurations, and are factory shipped with all downflow duct openings covered. The unit may be installed either on a rooftop or on a ground-level cement slab. (See Fig. 4 for roof curb dimensions.)

RECEIVING AND INSTALLATION

Step 1 — Check Equipment

IDENTIFY UNIT

The unit model number and serial number are printed on the unit informative plate. Check this information against shipping papers.

INSPECT SHIPMENT

Inspect for shipping damage before removing packaging materials. If unit appears to be damaged or is torn loose from its anchorage, have it examined by transportation inspectors before removal. Forward claim papers directly to transportation company. Manufacturer is not responsible for any damage incurred in transit. Check all items against shipping list. Immediately notify the nearest equipment distribution office if any item is missing. To prevent loss or damage, leave all parts in original packages until installation.

If the unit is to be mounted on a curb in a downflow application, review Step 7 to determine which method is to be used to remove the downflow panels before rigging and lifting into place. The panel removal process may require the unit to be on the ground.

Step 2 — Provide Unit Support

IMPORTANT: The unit must be secured to the curb by installing screws through the bottom of the curb flange and into the unit base rails. When installing large base units onto the common curb, the screws must be installed before allowing the full weight of the unit to rest on the curb. A minimum of six screws are required for large base units. Failure to secure unit properly could result in an unstable unit. See Warning near Rigging/Lifting information and accessory curb instructions for more details.

For hurricane tie downs, contact distributor for details and PE (Professional Engineering) Certificate if required.

ROOF CURB

Install accessory roof curb in accordance with instructions shipped with curb (See Fig. 4). Install insulation, cant strips, roofing, and flashing. Ductwork must be attached to curb.

IMPORTANT: The gasketing of the unit to the roof curb is critical for a water tight seal. Install gasketing material supplied with the roof curb. Improperly applied gasketing also can result in air leaks and poor unit performance.

Curb should be level to within 1/4 in. (6.35 mm) (See Fig 6). This is necessary for unit drain to function properly. Refer to accessory roof curb installation instructions for additional information as required.

Installation on older "G" series roof curbs.

Two accessory kits are available to aid in installing a new "G" series unit on an old "G" roof curb.

1. Accessory kit number CPADCURB001A00, (small chassis) and accessory kit number CPADCURB002A00, (large chassis) includes roof curb adapter and gaskets for the perimeter seal and duct openings. No additional modifications to the curb are required when using this kit.
2. An alternative to the adapter curb is to modify the existing curb by removing the outer horizontal flange and use accessory kit number CPGSKTKIT001A00 which includes spacer blocks (for easy alignment to existing curb) and gaskets for the perimeter seal and duct openings. This kit is used when existing curb is modified by removing outer horizontal flange.

CAUTION

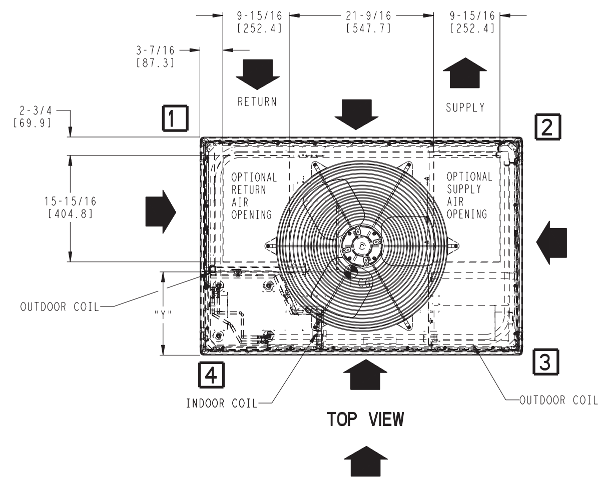
UNIT/STRUCTURAL DAMAGE HAZARD

Failure to follow this caution may result in property damage.

Ensure there is sufficient clearance for saw blade when cutting the outer horizontal flange of the roof curb so there is no damage to the roof or flashing.

SLAB MOUNT

Place the unit on a solid, level concrete pad that is a minimum of 4 in. (102 mm) thick with 2 in. (51 mm) above grade. The slab should extend approximately 2 in. (51 mm) beyond the casing on all 4 sides of the unit (See Fig. 7). Do not secure the unit to the slab *except* when required by local codes.



UNIT	ELECTRICAL CHARACTERISTICS	UNIT WT.		UNIT HEIGHT IN/MM		CENTER OF GRAVITY IN/MM					
		LB	KG	"A"		X		Y		Z	
50VL-A24---30	208/230-1-60	288	130.5	42-1/8	1070	20-1/2	520.7	15-3/4	400.1	16-5/8	422.3
50VL-A30---(3/5)0	208/230-1, 208/230-3-60	300	136.0	44-1/8	1121	20-1/2	520.7	15-3/4	400.1	16-5/8	422.3
50VL-A36---(3/5)0	208/230-1, 208/230-3-60	358	162.3	46-1/8	1172	20-1/2	520.7	15-3/4	400.1	17-3/8	441.3
50VL-A36---60	460-3-60	410	185.9	46-1/8	1172	20-1/2	520.7	15-3/4	400.1	17-3/8	441.3

UNITS	VOLTAGE	CORNER WEIGHT LB/KG							
		"1"		"2"		"3"		"4"	
50VL-A24---30	208/230	57.6	26.1	46.0	20.9	69.1	31.4	115.1	52.3
50VL-A30---(3/5)0	208/230	60.0	27.2	48.0	21.8	71.9	32.7	119.9	54.4
50VL-A36---(3/5)0	208/230	71.6	32.5	57.2	26.0	85.9	39.0	143.1	65.0
50VL-A36---60	460	71.6	32.5	57.2	26.0	94.9	43.1	148.1	67.2

NOTE: ALL TABLE DATA RELEVANT FOR ALL FACTORY INSTALLED OPTIONS EXCEPT ECONOMIZER

REQUIRED CLEARANCES TO COMBUSTIBLE MATL.

INCHES [MM]
TOP OF UNIT....14 [355.6]
DUCT SIDE OF UNIT....2 [50.8]
SIDE OPPOSITE DUCTS....14 [355.6]
BOTTOM OF UNIT....0 [0.0]
ELECTRICAL PANEL....36 [914.4]

NEC. REQUIRED CLEARANCES.

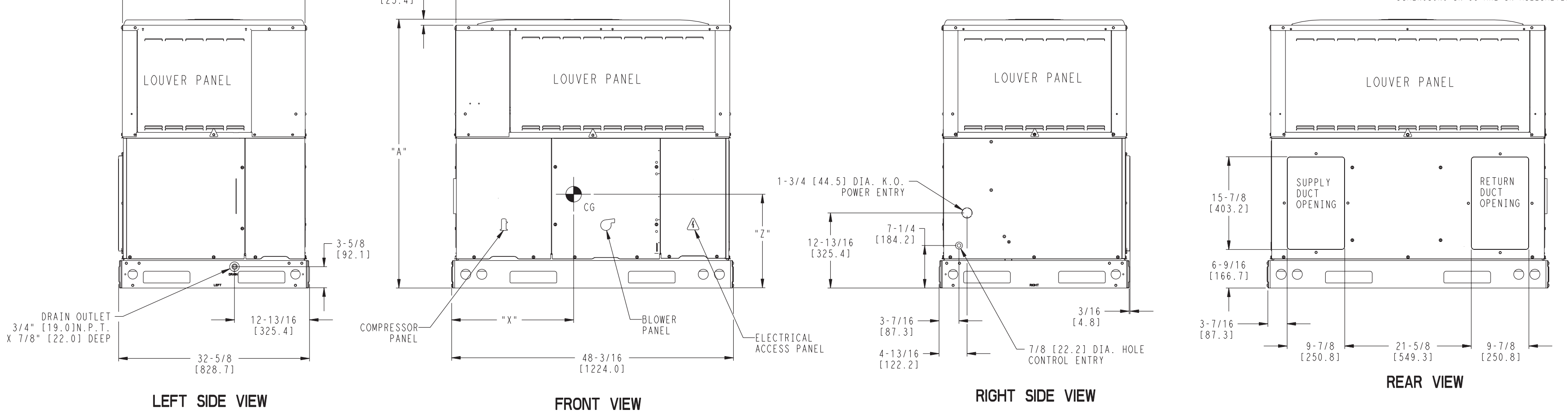
INCHES [MM]
BETWEEN UNITS, POWER ENTRY SIDE....42 [1066.8]
UNIT AND UNGROUNDED SURFACES, POWER ENTRY SIDE....36 [914.0]
UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, POWER ENTRY SIDE....42 [1066.8]

REQUIRED CLEARANCE FOR OPERATION AND SERVICING

INCHES [MM]
EVAP. COIL ACCESS SIDE....36 [914.0]
POWER ENTRY SIDE....42 [1066.8]
(EXCEPT FOR NEC REQUIREMENTS)
UNIT TOP....48 [1219.2]
SIDE OPPOSITE DUCTS....36 [914.0]
DUCT PANEL....12 [304.8]*

*MINIMUM DISTANCES: IF UNIT IS PLACED LESS THAN 12 [304.8] FROM WALL SYSTEM, THEN SYSTEM PERFORMANCE MAYBE COMPROMISED.

DIMENSIONS IN [] ARE IN MILLIMETERS

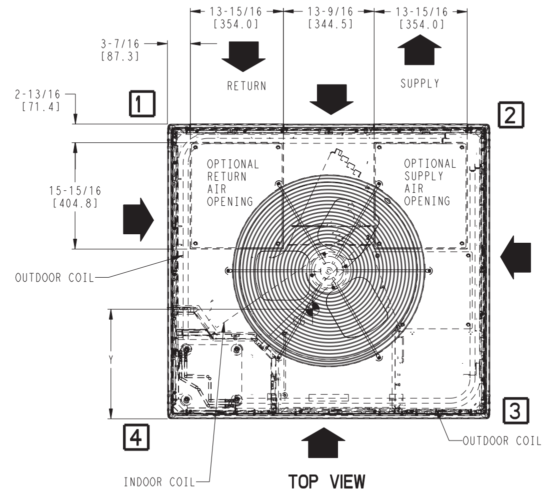


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Fig. 2 - 50VL-A24-36 Unit Dimensions

50VL-A



UNIT	ELECTRICAL CHARACTERISTICS	UNIT WT. LB	UNIT WT. KG	UNIT HEIGHT IN/MM "A"		CENTER OF GRAVITY IN/MM X		Y		Z	
50VL-A42---(3/5)0	208/230-1, 208/230-3-60	412	187.0	44-3/4	1137	20-1/4	514.4	17-1/2	444.5	17-5/8	447.7
50VL-A42---60	460-3-60	482	218.7	44-3/4	1137	20-1/4	514.4	17-1/2	444.5	17-5/8	447.7
50VL-A48---(3/5)0	208/230-1, 208/230-3-60	430	195.2	48-3/4	1238	20-1/4	514.4	17-1/2	444.5	17-5/8	447.7
50VL-A48---60	460-3-60	505	229.2	48-3/4	1238	20-1/4	514.4	17-1/2	444.5	17-5/8	447.7
50VL-A60---(3/5)0	208/230-1, 208/230-3-60	458	207.9	52-3/4	1340	20-1/4	514.4	17-1/2	444.5	18	457.2
50VL-A60---60	460-3-60	541	245.5	52-3/4	1340	20-1/4	514.4	17-1/2	444.5	18	457.2

UNIT	VOLTAGE	CORNER WEIGHTS LB/KG "1"		"2"		"3"		"4"	
50VL-A42---(3/5)0	208/230	82.4	37.4	66.0	29.9	98.9	44.9	164.9	74.9
50VL-A42---60	460	82.4	37.4	66.0	29.9	107.9	49.0	169.9	77.1
50VL-A48---(3/5)0	208/230	86.0	39.1	68.8	31.3	103.3	46.9	172.1	78.1
50VL-A48---60	460	86.0	39.1	68.8	31.3	112.3	51.0	177.1	80.4
50VL-A60---(3/5)0	208/230	91.6	41.6	73.3	33.3	110.0	49.9	183.3	83.2
50VL-A60---60	460	91.6	41.6	73.3	33.3	119.0	54.0	188.3	85.5

NOTE: ALL TABLE DATA RELEVANT FOR ALL FACTORY INSTALLED OPTIONS EXCEPT ECONOMIZER

REQUIRED CLEARANCES TO COMBUSTIBLE MATL.

INCHES [MM]
TOP OF UNIT....14 [355.6]
DUCT SIDE OF UNIT....2 [50.8]
SIDE OPPOSITE DUCTS....14 [355.6]
BOTTOM OF UNIT....0 [0.0]
ELECTRICAL PANEL....36 [914.4]

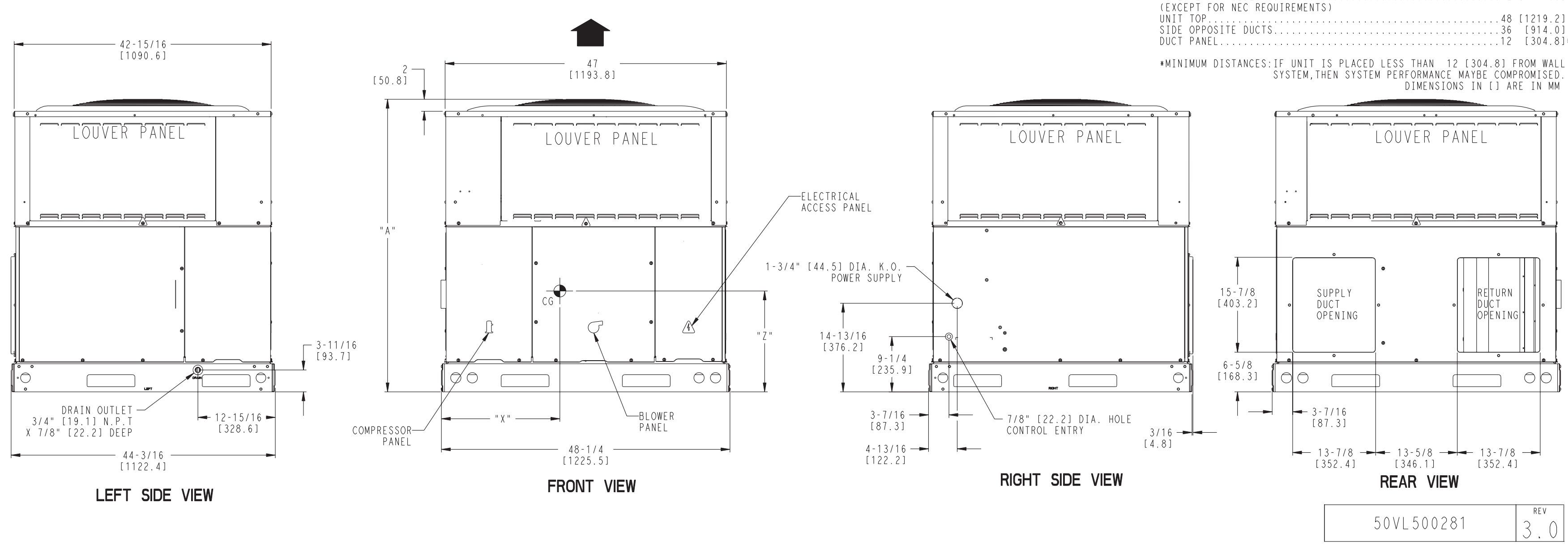
NEC. REQUIRED CLEARANCES.

INCHES [MM]
BETWEEN UNITS, POWER ENTRY SIDE....42 [1066.8]
UNIT AND UNGROUNDED SURFACES, POWER ENTRY SIDE....36 [914.0]
UNIT AND BLOCK OR CONCRETE WALLS AND OTHER
GROUNDED SURFACES, POWER ENTRY SIDE....42 [1066.8]

REQUIRED CLEARANCE FOR OPERATION AND SERVICING

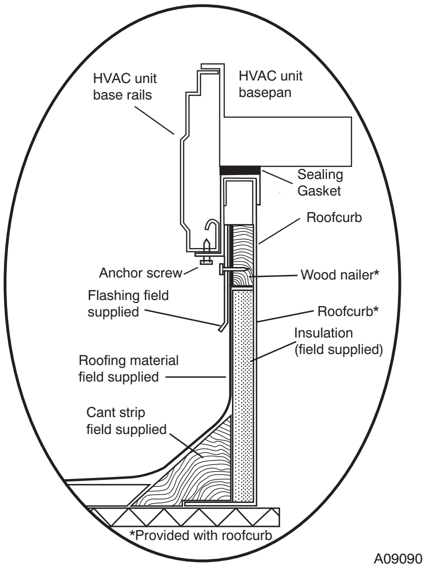
INCHES [MM]
EVAP. COIL ACCESS SIDE....36 [914.0]
POWER ENTRY SIDE....42 [1066.8]
(EXCEPT FOR NEC REQUIREMENTS)
UNIT TOP....48 [1219.2]
SIDE OPPOSITE DUCTS....36 [914.0]
DUCT PANEL....12 [304.8]*

*MINIMUM DISTANCES: IF UNIT IS PLACED LESS THAN 12 [304.8] FROM WALL SYSTEM, THEN SYSTEM PERFORMANCE MAYBE COMPROMISED. DIMENSIONS IN [ ] ARE IN MM

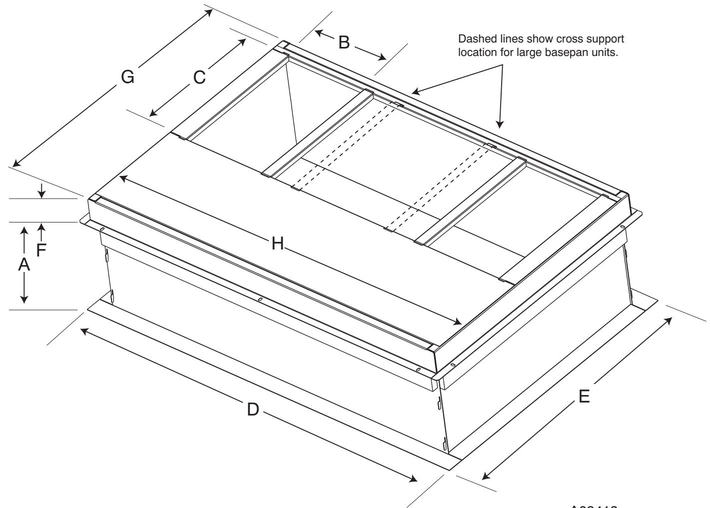


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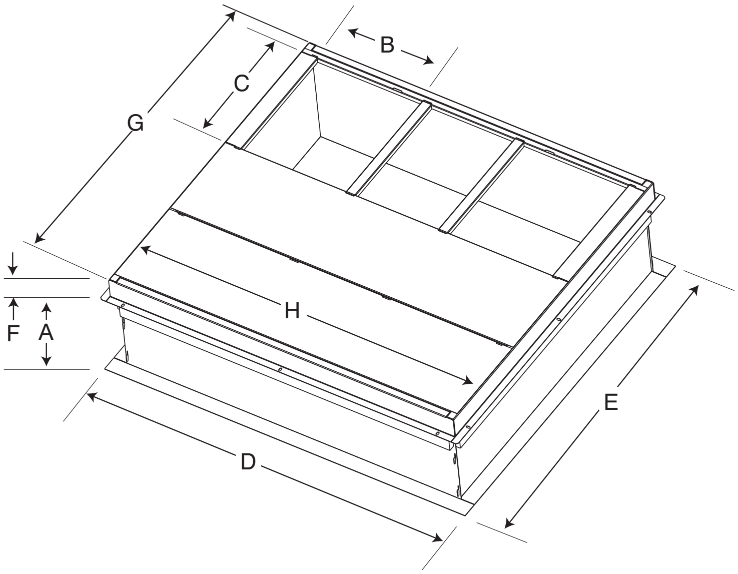
Fig. 3 - 50VL-A42-60 Unit Dimensions



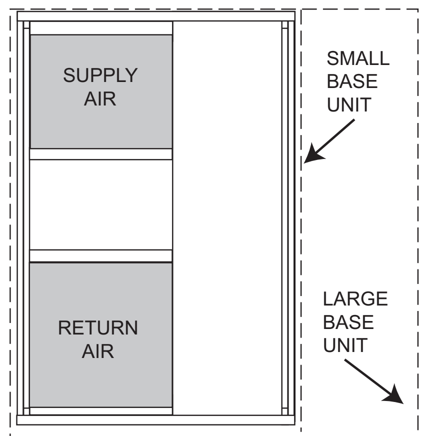
ROOF CURB DETAIL



SMALL/COMMON CURB



LARGE CURB



UNIT PLACEMENT ON COMMON CURB

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SMALL OR LARGE BASE UNIT

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UNIT SIZE	CATALOG NUMBER	A IN. (mm)	B (small/common base) IN. (mm)*	B (large base) IN. (mm)*	C IN. (mm)	D IN. (mm)	E IN. (mm)	F IN. (mm)	G IN. (mm)	H IN. (mm)
Small or Large	CPRFCURB010A00	11 (279)	10 (254)	14 (356)	16 (406)	47.8 (1214)	32.4 (822)	2.7 (69)	30.6 (778)	46.1 (1170)
	CPRFCURB011A00	14 (356)								
Large	CPRFCURB012A00	11 (279)	14 (356)				43.9 (1116)		42.2 (1072)	
	CPRFCURB013A00	14 (356)								

* Part Numbers CPRCURB010A00 and CPRCURB011A00 can be used on both small and large basepan units. The cross supports must be located based on whether the unit is a small basepan or a large basepan.

NOTES:

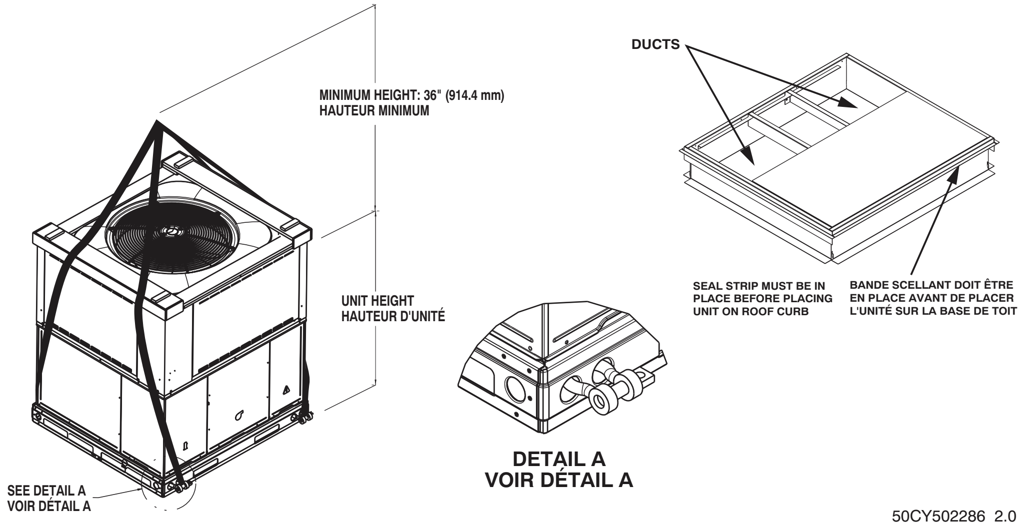
1. Roof curb must be set up for unit being installed.
2. Seal strip must be applied, as required, to unit being installed.
3. Roof curb is made of 16-gauge steel.
4. Attach ductwork to curb (flanges of duct rest on curb).
5. Insulated panels: 1-in. (25.4 mm) thick fiberglass 1 lb. density.

Fig. 4 - Roof Curb Dimensions

⚠ CAUTION - NOTICE TO RIGGERS
⚠ PRUDENCE - AVIS AUX MANIPULATEUR

ACCESS PANELS MUST BE IN PLACE WHEN RIGGING.
PANNEAUX D'ACCES DOIT ÊTRE EN PLACE POUR MANIPULATION.

Use top skid as spreader bar. / Utiliser la palette du haut comme barre de répartition



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SMALL CABINET								LARGE CABINET						
Unit*	24		30		36			Unit*	42		48		60	
	lb	kg	lb	kg	lb	kg			lb	kg	lb	kg	lb	kg
Rigging Weight	295	134	307	139	365	166		Rigging Weight	421	191	439	199	467	212

* For 460 volt units, add 14 lb (6.35 kg) to the rigging weight.
NOTE: See dimensional drawing for corner weighs.

Fig. 5 - 50VL-A Unit Suggested Rigging

Step 3 — Provide Clearances

The required minimum service clearances are shown in Fig. 2 and 3. Adequate ventilation and outdoor air must be provided. The outdoor fan draws air through the outdoor coil and discharges it through the top fan grille. Be sure that the fan discharge does not recirculate to the outdoor coil. Do not locate the unit in either a corner or under an overhead obstruction. The minimum clearance under a partial overhang (such as a normal house overhang) is 48 in. (1219 mm) above the unit top. The maximum horizontal extension of a partial overhang must not exceed 48 in. (1219 mm)

IMPORTANT: Do not restrict outdoor airflow. An air restriction at either the outdoor-air inlet or the fan discharge may be detrimental to compressor life.

Do not place the unit where water, ice, or snow from an overhang or roof will damage or flood the unit. Do not install the unit on carpeting or other combustible materials. Slab-mounted units should be at least 4 in. (102 mm) above the highest expected water and runoff levels. Do not use unit if it has been under water.

Step 4 — Field-Fabricate Ductwork

Secure all ducts to roof curb and building structure on vertical discharge units. Do not connect ductwork to unit. For horizontal applications, unit is provided with flanges on the horizontal openings. All ductwork should be secured to the flanges. Insulate and weatherproof all external ductwork, joints, and roof openings with counter flashing and mastic in accordance with applicable codes.

Ducts passing through an unconditioned space must be insulated and covered with a vapor barrier. If a plenum return is used on a vertical unit, the return should be ducted through the roof deck to comply with applicable fire codes. See unit rating plate for any required clearances around ductwork. Cabinet return-air static shall not exceed -.25 IN. W.C.

Step 5 — Rig and Place Unit

Rigging and handling of this equipment can be hazardous for many reasons due to the installation location (roofs, elevated structures, etc.).

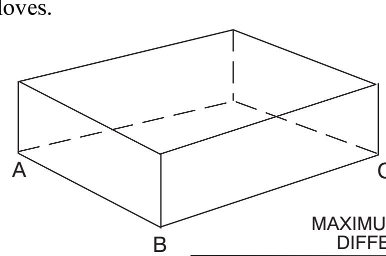
Only trained, qualified crane operators and ground support staff should handle and install this equipment.

When working with this equipment, observe precautions in the literature, on tags, stickers, and labels attached to the equipment, and any other safety precautions that might apply.

Training for operators of the lifting equipment should include, but not be limited to, the following:

1. Application of the lifter to the load, and adjustment of the lifts to adapt to various sizes or kinds of loads.
2. Instruction in any special operation or precaution.
3. Condition of the load as it relates to operation of the lifting kit, such as balance, temperature, etc.

Follow all applicable safety codes. Wear safety shoes and work gloves.



MAXIMUM ALLOWABLE DIFFERENCE in. (mm)

A-B	B-C	A-C
1/4 (6.35)	1/4 (6.35)	1/4 (6.35)

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Fig. 6 - Unit Leveling Tolerances

INSPECTION

Prior to initial use, and at monthly intervals, all rigging shackles, clevis pins, and straps should be visually inspected for any damage, evidence of wear, structural deformation, or cracks. Particular attention should be paid to excessive wear at hoist hooking points and load support areas. Materials showing any kind of wear in these areas must not be used and should be discarded.

⚠ WARNING

UNIT FALLING HAZARD

Failure to follow this warning could result in personal injury or death.

Never stand beneath rigged units or lift over people.

1. Leave top shipping skid on the unit for use as a spreader bar to prevent the rigging straps from damaging the unit. If the skid is not available, use a spreader bar of sufficient length to protect the unit from damage.

⚠ WARNING

PROPERTY DAMAGE HAZARD

Failure to follow this warning could result in personal

When straps are taut, the clevis should be a minimum of 36 in. (914 mm) above the unit top cover.

Rigging/Lifting of Unit (See Fig. 5)

⚠ WARNING

UNIT FALLING HAZARD

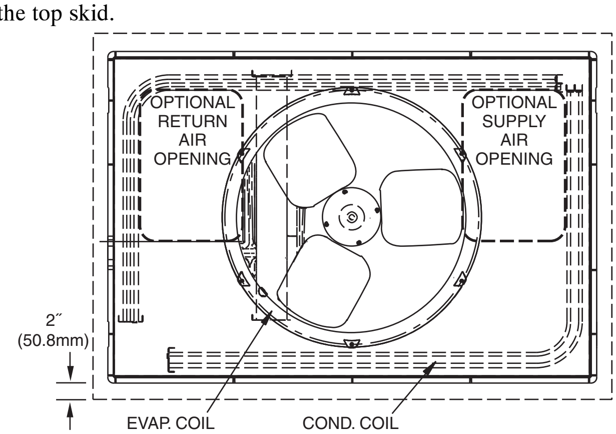
Failure to follow this warning could result in personal injury or death.

Large base units must be secured to common curb before allowing full weight of unit to rest on curb. Install screws through curb into unit base rails while rigging crane is still supporting unit.

Lifting holes are provided in base rails as shown.

1. Attach shackles, clevis pins, and straps to the base rails of the unit. Be sure materials are rated to hold the weight of the unit (See Fig. 5).
2. Attach a clevis of sufficient strength in the middle of the straps. Adjust the clevis location to ensure unit is lifted level with the ground.

After the unit is placed on the roof curb or mounting pad, remove the top skid.



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Fig. 7 - Slab Mounting Detail

50VL–A

Step 6 — Connect Condensate Drain

NOTE: When installing condensate drain connection be sure to comply with local codes and restrictions.

Model 50VL–A disposes of condensate water through a 3/4 in. NPT fitting which exits through the base on the evaporator coil access side. See Fig. 2 and 3 for location.

Condensate water can be drained directly onto the roof in rooftop installations (where permitted) or onto a gravel apron in ground level installations. Install a field–supplied 2–in. (51 mm) condensate trap at end of condensate connection to ensure proper drainage. Make sure that the outlet of the trap is at least 1 in. (25 mm) lower than the drain pan condensate connection to prevent the pan from overflowing (See Fig. 8). When using a gravel apron, make sure it slopes away from the unit.

Connect a drain tube using a minimum of 3/4 –in. PVC or 3/4 –in. copper pipe (all field–supplied) at the outlet end of the 2–in. (51 mm) trap. Do not undersize the tube. Pitch the drain tube downward at a slope of at least 1–in. (25 mm) for every 10 ft (3.1 m) of horizontal run. Be sure to check the drain tube for leaks. Prime trap at the beginning of the cooling season start–up.

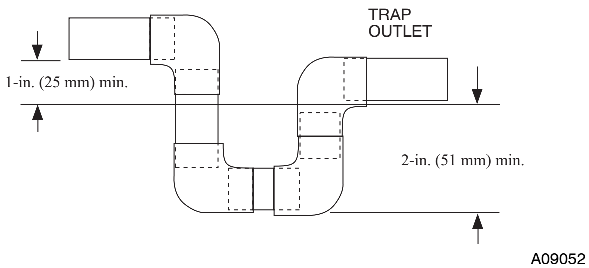


Fig. 8 – Condensate Trap

Step 7 — Install Duct Connections

The design and installation of the duct system must be in accordance with the standards of the NFPA for installation of non–residence type air conditioning and ventilating systems, NFPA 90A or residence type, NFPA 90B and/or local codes and ordinances.

Select and size ductwork, supply–air registers, and return air grilles according to ASHRAE (American Society of Heating, Refrigeration, and Air Conditioning Engineers) recommendations. The unit has duct flanges on the supply– and return–air openings on the side of the unit.

When designing and installing ductwork, consider the following:

1. All units should have field–supplied filters or accessory filter rack installed in the return–air side of the unit. Recommended sizes for filters are shown in Table 1.
2. Avoid abrupt duct size increases and reductions. Abrupt change in duct size adversely affects air performance.

IMPORTANT: Use flexible connectors between ductwork and unit to prevent transmission of vibration. Use suitable gaskets to ensure weather–tight and airtight seal. When electric heat is installed, use fireproof canvas (or similar heat resistant material) connector between ductwork and unit discharge connection. If flexible duct is used, insert a sheet metal sleeve inside duct. Heat resistant duct connector (or sheet metal sleeve) must extend 24–in. (610 mm) from electric heater element.

3. Size ductwork for cooling air quantity (cfm). The minimum air quantity for proper electric heater operation is listed in Table 2. Heater limit switches may trip at air quantities below those recommended.
4. Seal, insulate, and weatherproof all external ductwork. Seal, insulate and cover with a vapor barrier all ductwork passing through conditioned spaces. Follow latest Sheet Metal and Air Conditioning Contractors National Association (SMACNA) and Air Conditioning Contractors Association (ACCA) minimum installation standards for residential heating and air conditioning systems.
5. Secure all ducts to building structure. Flash, weatherproof, and vibration–isolate duct openings in wall or roof according to good construction practices.

CONFIGURING UNITS FOR DOWNFLOW (VERTICAL) DISCHARGE

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

Before performing service or maintenance operations on the system, turn off main power to unit and install lockout tag.

1. Open all electrical disconnects and install lockout tag before starting any service work.
2. Remove horizontal (metal) ductcovers to access vertical (downflow) discharge duct knockouts in unit basepan. (See Fig. 9.)

To remove downflow return and supply knockout covers, break front and right side connecting tabs with a screwdriver and hammer. Push cover down to break rear and left side tabs.

NOTE: These panels are held in place with tabs similar to an electrical knockout. Reinstall horizontal duct covers (Fig. 9) shipped on unit from factory. Insure openings are air and watertight.

NOTE: The design and installation of the duct system must be in accordance with the standards of the NFPA for installation of nonresidence–type air conditioning and ventilating systems, NFPA 90A or residence–type, NFPA 90B; and/or local codes and ordinances.

Adhere to the following criteria when selecting, sizing, and installing the duct system:

1. Units are shipped for side shot installation.
2. Select and size ductwork, supply–air registers, and return–air grilles according to American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) recommendations.
3. Use flexible transition between rigid ductwork and unit to prevent transmission of vibration. The transition may be screwed or bolted to duct flanges. Use suitable gaskets to ensure weather–tight and airtight seal.
4. All units must have field–supplied filters or accessory filter rack installed in the return–air side of the unit. Recommended sizes for filters are shown in Table 1.
5. Size all ductwork for maximum required airflow (either heating or cooling) for unit being installed. Avoid abrupt duct size increases or decreases or performance may be affected.
6. Adequately insulate and weatherproof all ductwork located outdoors. Insulate ducts passing through unconditioned space, and use vapor barrier in accordance with latest issue of Sheet Metal and Air Conditioning Contractors National Association (SMACNA) and Air Conditioning Contractors of America (ACCA) minimum installation standards for heating and air conditioning systems. Secure all ducts to building structure.
7. Flash, weatherproof, and vibration–isolate all openings in building structure in accordance with local codes and good building practices.

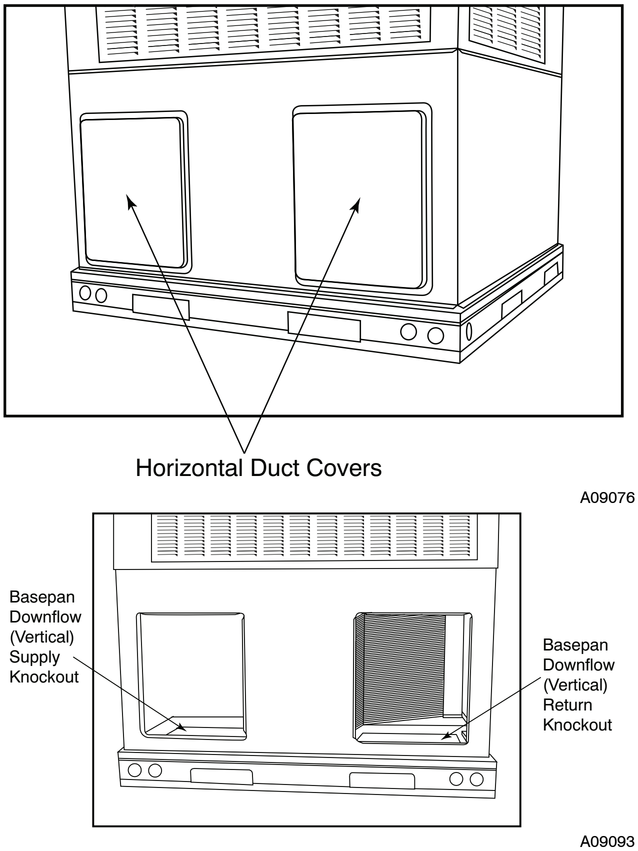


Fig. 9 - Supply and Return Duct Opening

Step 8 — Install Electrical Connections

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

The unit cabinet must have an uninterrupted, unbroken electrical ground to minimize the possibility of personal injury if an electrical fault should occur. This ground may consist of an electrical wire connected to the unit ground screw in the control compartment, or conduit approved for electrical ground when installed in accordance with NFPA 70 (NEC) (latest edition) (in Canada, Canadian Electrical Code CSA C22.1) and local electrical codes.

⚠ CAUTION

UNIT COMPONENT DAMAGE HAZARD

Failure to follow this caution may result in damage to the unit being installed.

1. Make all electrical connections in accordance with NFPA 70 (NEC) (latest edition) and local electrical codes governing such wiring. In Canada, all electrical connections must be in accordance with CSA standard C22.1 Canadian Electrical Code Part 1 and applicable local codes. Refer to unit wiring diagram.
2. Use only copper conductor for connections between field-supplied electrical disconnect switch and unit. DO NOT USE ALUMINUM WIRE.
3. Be sure that high-voltage power to unit is within operating voltage range indicated on unit rating plate. On 3-phase units, ensure phases are balanced within 2 percent. Consult local power company for correction of improper voltage and/or phase imbalance.
4. Do not damage internal components when drilling through any panel to mount electrical hardware, conduit, etc.

HIGH-VOLTAGE CONNECTIONS

The unit must have a separate electrical service with a field-supplied, waterproof disconnect switch mounted at, or within sight from the unit. Refer to the unit rating plate, NEC and local codes for maximum fuse/circuit breaker size and minimum circuit amps (ampacity) for wire sizing.

The field-supplied disconnect may be mounted on the unit over the high-voltage inlet hole when the standard power and low-voltage entry points are used. See Fig. 2 and 3 for acceptable location.

See unit wiring label (Fig. 12, 13 and 14) and Fig. 10 for reference when making high voltage connections. Proceed as follows to complete the high-voltage connections to the unit.

Single phase units:

1. Run the high-voltage (L1, L2) and ground lead into the control box.
2. Connect ground lead to chassis ground connection.
3. Locate the black and yellow wires connected to the line side of the contactor.
4. Connect field L1 to black wire on connection 11 of the compressor contactor.

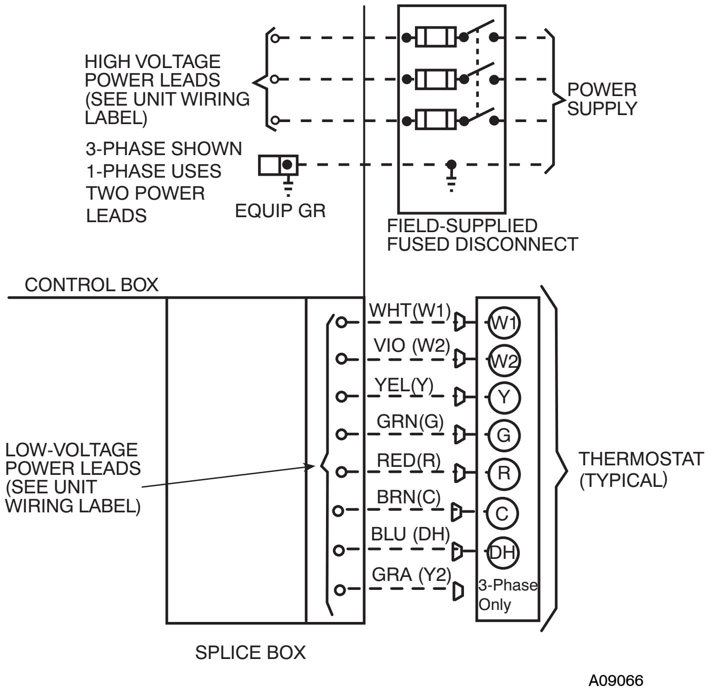


Fig. 10 - High- and Control-Voltage Connections

5. Connect field wire L2 to yellow wire on connection 23 of the compressor contactor.

Three-phase units:

1. Run the high-voltage (L1, L2, L3) and ground lead into the control box.
2. Connect ground lead to chassis ground connection.
3. Locate the black and yellow wires connected to the line side of the contactor.
4. Connect field L1 to black wire on connection 11 of the compressor contactor.
5. Connect field wire L3 to yellow wire on connection 13 of the compressor contactor.
6. Connect field wire L2 to blue wire from compressor.

SPECIAL PROCEDURES FOR 208-V OPERATION

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

Before installing or servicing system, always turn off main power to system and install lockout tag. With disconnect switch open, move black wire from transformer (3/16 in.)(4.8 mm) terminal marked 230 to terminal marked 208. This retaps transformer to primary voltage of 208 vac.

CONTROL VOLTAGE CONNECTIONS

NOTE: Do not use any type of power-stealing thermostat. Unit control problems may result.

Use no. 18 American Wire Gage (AWG) color-coded, insulated (35°C minimum) wires to make the control voltage connections between the thermostat and the unit. If the thermostat is located more than 100 ft (30.5 m) from the unit (as measured along the control voltage wires), use no. 16 AWG color-coded, insulated (35° C minimum) wires.

STANDARD CONNECTION

Locate the seven (eight for 3-phase) low voltage thermostat leads in 24 volt splice box. A gray wire is standard on 3-phase units for connection to an economizer. See Fig. 10 for connection diagram. Run the low-voltage leads from the thermostat, through the control wiring inlet hole grommet (Fig. 2 and 3), and into the low-voltage splice box. Provide a drip loop before running wires through panel. Secure and strain relief all wires so that they do not interfere with operation of unit.

If an accessory electric heater is installed, low voltage leads from heater must be connected to factory supplied control leads from Indoor Fan Board P4 connector.

NOTE: If the unit 24V wires do not have a matching receptacle, cut the 24V wires from the electric heater plug, strip the ends, and wire nut together to match the schematic connections. If the electric heater 24V wires do not have a matching plug, cut the 24V wires from the unit receptacle, strip the ends, and wire nut together to match the schematic connections.

Factory wires are provided for electric heat staging W1 and W2 (W2 and W3 on IFB). If room thermostat has only one stage of supplemental heat, connect white and violet wires shown in Fig. 10 to second stage heat field wire.

Some electric heaters have four control wires (plus common wire). Consult unit wiring diagram and electric heater wiring diagram for additional details.

TRANSFORMER PROTECTION

The transformer is of the energy-limiting type, however a direct short will likely blow a secondary fuse. If an overload or short is present, correct overload condition and check for blower fuse on Indoor Fan Board. Replace fuse as required with correct size and rating.

Table 1 – Physical Data-Unit 50VL-A

UNIT SIZE	24	30	36	42	48	60
NOMINAL CAPACITY (ton)	2	2–1/2	3	3–1/2	4	5
SHIPPING WEIGHT* lb. **SHIPPING WEIGHT* (kg)**	295 134	307 139	365 166	421 191	439 199	467 212
COMPRESSORS	Scroll					
Quantity	1					
REFRIGERANT (R–410A) Quantity lb Quantity (kg)	6.0 2.7	5.6 2.5	9.5 4.3	8.8 4.0	9.4 4.3	12.5 5.7
REFRIGERANT METERING DEVICE	TXV					
OUTDOOR COIL Rows...Fins/in. Face Area (sq ft)	1...21 11.9	1...21 13.6	2...21 15.4	2...21 13.6	2...21 17.5	2...21 21.4
OUTDOOR FAN Nominal Cfm Diameter in. Diameter (mm) Motor Hp (Rpm)	2500 24 609.6 1/10 (810)	2700 24 609.6 1/10 (810)	2800 24 609.6 1/5 (810)	3000 26 660.4 1/5 (810)	3200 26 660.4 1/5 (810)	3600 26 660.4 1/5 (810)
INDOOR COIL Rows...Fins/in. Face Area (sq ft)	3...17 3.7	3...17 3.7	3...17 3.7	3...17 4.7	3...17 4.7	3...17 5.7
INDOOR BLOWER Nominal Cooling Airflow (Cfm) Size in. Size (mm.) Motor HP (RPM)	800 10x10 254x254 1/2 (1050)	1000 10x10 254x254 1/2 (1050)	1200 11x10 279.4x254 3/4 (1000)	1400 11x10 279.4x254 3/4 (1075)	1600 11x10 279.4x254 1.0 (1075)	1750 11x10 279.4x254 1.0 (1040)
HIGH–PRESSURE SWITCH (psig) Cut–out Reset (Auto)	650 +/– 15 420 +/– 25					
LOSS–OF–CHARGE / LOW–PRESSURE SWITCH (Liquid Line) (psig) cut–out Reset (auto)	20 +/– 5 45 +/– 10					
RETURN–AIR FILTERS†‡ Throwaway Size in. Throwaway Size (mm)	20x20x1 508x508x25	20x24x1 508x610x25	24x30x1 610x762x25		24x36x1 610x914x25	

*For 460 volt units add 14 lb (6.35 kg) to the shipping weight.

† Required filter sizes shown are based on the larger of the AHRI (Air Conditioning Heating and Refrigeration Institute) rated cooling airflow or the heating airflow velocity of 300 ft/minute for throwaway type or 450 ft/minute for high–capacity type. Air filter pressure drop for non–standard filters must not exceed 0.08 in. W.C.

‡ If using accessory filter rack refer to the filter rack installation instructions for correct filter sizes and quantity.

Table 2 – Minimum Airflow for Safe Electric Heater Operation (CFM)

SIZE	24	30	36	42	48	60
Cfm	800	1000	1200	1400	1600	1750

PRE-START-UP

⚠ WARNING

ENVIRONMENTAL, FIRE, EXPLOSION, ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death and/or property damage.

1. Follow recognized safety practices and wear protective goggles when checking or servicing refrigerant system.
2. Relieve and recover all refrigerant from system before touching or disturbing compressor plug if refrigerant leak is suspected around compressor terminals.
3. Never attempt to repair soldered connection while refrigerant system is under pressure.
4. Do not use torch to remove any component. System contains oil and refrigerant under pressure.
5. To remove a component, wear protective goggles and proceed as follows:
   a. Shut off electrical power to unit and install lockout tag.
   b. Relieve and reclaim all refrigerant from system using both high- and low-pressure ports.
   c. Cut component connecting tubing with tubing cutter and remove component from unit.
   d. Carefully unsweat remaining tubing stubs when necessary. Oil can ignite when exposed to torch flame.

Proceed as follows to inspect and prepare the unit for initial start-up:

1. Remove all access panels (see Fig. 17).
2. Read and follow instructions on all DANGER, WARNING, CAUTION, and INFORMATION labels attached to, or shipped with unit.
3. Make the following inspections:
   a. Inspect for shipping and handling damages, such as broken lines, loose parts, disconnected wires, etc.
   b. Inspect for oil at all refrigerant tubing connections and on unit base. Detecting oil generally indicates a refrigerant leak. Leak test all refrigerant tubing connections using electronic leak detector, or liquid-soap solution. If a refrigerant leak is detected, see following **Check for Refrigerant Leaks** section.
   c. Inspect all field- and factory-wiring connections. Be sure that connections are completed and tight.
   d. Ensure wires do not touch refrigerant tubing or sharp sheet metal edges.
   e. Inspect coil fins. If damaged during shipping and handling, carefully straighten fins with a fin comb.
4. Verify the following conditions:
   a. Make sure that condensate drain pan and trap are filled with water to ensure proper drainage.
   b. Make sure that all tools and miscellaneous loose parts have been removed.

START-UP

Step 1 — Check for Refrigerant Leaks

Proceed as follows to locate and repair a refrigerant leak and to charge the unit:

1. Locate leak and make sure that refrigerant system pressure has been relieved and reclaimed from both high- and low-pressure ports.
2. Repair leak following accepted practices.

NOTE: Install a filter drier whenever the system has been opened for repair.

3. Add a small charge of Puron (R-410A) refrigerant vapor to system and leak-test unit.
4. Recover refrigerant from system and evacuate to 500 microns if no additional leaks are found.
5. Charge unit with Puron (R-410A) refrigerant, using an accurate scale. Refer to unit rating plate for required charge.

Step 2 — Start-Up Cooling Section And Make Adjustments

Complete the required procedures given in the Pre-Start-Up section before starting the unit. Do not jumper any safety devices when operating the unit. Do not operate the unit when the outdoor temperature is below 40°F (4°C) (unless accessory low-ambient kit is installed). Do not rapid cycle the compressor. Allow 5 minutes between “on” cycles to prevent compressor damage.

CHECKING COOLING CONTROL OPERATION

Start and check the unit for proper cooling control operation as follows:

1. Place room thermostat SYSTEM switch in OFF position. Observe that blower motor starts when FAN switch is placed in ON position and shuts down when FAN switch is placed in AUTO position.
2. Place SYSTEM switch in COOL position and FAN switch in AUTO position. Set cooling control below room temperature. Observe that compressor, condenser fan, and evaporator blower motors start. Observe that compressor and outdoor fan shut down when control setting is satisfied and that indoor blower shuts down after 90 second fan time delay expires.

IMPORTANT: Three-phase, scroll compressors are direction oriented. Unit must be checked to ensure proper compressor 3-phase power lead orientation. If not corrected within 5 minutes, the internal protector will shut off the compressor. The 3-phase power leads to the unit must be reversed to correct rotation. When turning backwards, the difference between compressor suction and discharge pressures may be minimal.

CHECKING AND ADJUSTING REFRIGERANT CHARGE

The refrigerant system is fully charged with Puron (R-410A) refrigerant and is tested and factory sealed.

NOTE: Adjustment of the refrigerant charge is not required unless the unit is suspected of not having the proper Puron (R-410A) charge.

A subcooling charging chart is attached to the inside of the compressor access panel (see Fig. 17). The chart includes the required liquid line temperature at given discharge line pressures and outdoor ambient temperatures.

An accurate thermocouple- or thermistor-type thermometer, and a gauge manifold are required when using the subcooling charging method for evaluating the unit charge. Do not use mercury or small dial-type thermometers because they are not adequate for this type of measurement.

NOTE: Allow system to operate for a minimum of 15 minutes before checking or adjusting refrigerant charge.

IMPORTANT: When evaluating the refrigerant charge, an indicated adjustment to the specified factory charge must always be very minimal. If a substantial adjustment is indicated, an abnormal condition exists somewhere in the cooling system, such as insufficient airflow across either coil or both coils.

Proceed as follows:

1. Remove caps from low- and high-pressure service fittings.
2. Using hoses with valve core depressors, attach low- and high-pressure gauge hoses to low- and high-pressure service fittings, respectively.
3. Start unit and let run until system pressures stabilize.
4. Measure and record the following:
   a. Outdoor ambient-air temperature (°F [°C] db).
   b. Liquid line temperature (°F [°C]) at TXV.
   c. Discharge (high-side) pressure (psig).
   d. Suction (low-side) pressure (psig) (for reference only).
5. Using Cooling Charging Charts compare outdoor-air temperature (°F [°C] db) with the discharge line pressure (psig) to determine desired system operating liquid line temperature (See Fig. 15).
6. Compare actual liquid line temperature with desired liquid line temperature. Using a tolerance of ±2°F (±1.1°C), add refrigerant if actual temperature is more than 2°F (1.1°C) higher than proper liquid line temperature, or remove refrigerant if actual temperature is more than 2°F (1.1°C) lower than required liquid line temperature.

NOTE: If the problem causing the inaccurate readings is a refrigerant leak, refer to Check for Refrigerant Leaks section.

INDOOR AIRFLOW AND AIRFLOW ADJUSTMENTS

⚠ CAUTION

UNIT OPERATION HAZARD

Failure to follow this caution may result in unit damage.

For cooling operation, the recommended airflow is 350 to 450 cfm for each 12,000 Btuh of rated cooling capacity. For heating operation, the airflow must produce a temperature rise that falls within the range stamped on the unit rating plate.

NOTE: Be sure that all supply-and return-air grilles are open, free from obstructions, and adjusted properly.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

Disconnect electrical power to the unit and install lockout tag before changing blower speed.

This unit is factory-set up for use with a single cooling fan speed. In addition, this unit has the field-selectable capability to run two different cooling fan speeds: The rated cooling fan speed (350~400 CFM/Ton) and an enhanced dehumidification fan speed (As low as 320 CFM/Ton) for use with either a dehumidistat or a thermostat that supports dehumidification.

The cooling speed is marked "LOW" on the interface fan board (IFB) (See Fig. 11) . The factory-shipped settings are noted in Table 4. There are 4 additional speed tap wires available for use in either electric heating or cooling (For color coding on the indoor fan motor leads, see Table 3). The additional 4 speed tap wires are shipped loose with vinyl caps and are located in the control box, near the interface fan board (IFB) (See Fig. 11).

SINGLE COOLING FAN SPEED SET-UP (Dehumidification feature not used)

To change cooling speed:

1. Remove the vinyl cap off of the desired speed tap wire (Refer to Table 3 for color coding). Add the wet coil pressure drop in Table 6 to the system static to determine the correct cooling airflow speed in Table 4 that will deliver the nominal cooling airflow as listed in Table 1 for each size.
2. Remove the current speed tap wire from the "LOW" terminal on the interface fan board (IFB) (See Fig. 11) and place vinyl cap over the connector on the wire.
3. Connect the desired speed tap wire to the "LOW" terminal on the interface fan board (IFB).

NOTE: If accessory electric heat is installed, and the electric heat fan speed is chosen to be the same as the normal cooling fan speed, the dry airflow must meet or exceed the minimum airflow speed specified in Table 2 for the specific size unit.

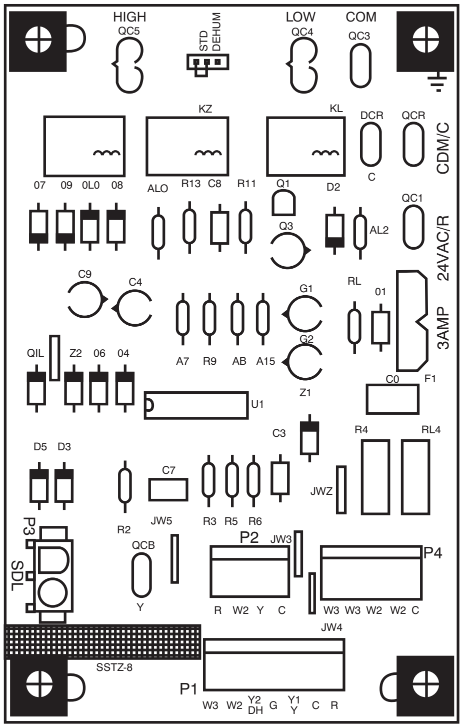
TWO COOLING FAN SPEEDS SET-UP (Dehumidification feature used)

IMPORTANT: Dehumidification control must open control circuit on humidity rise above set point.

Use of the dehumidification cooling fan speed requires use of either a 24 VAC dehumidistat or a thermostat which includes control of a 24 VAC dehumidistat connection. In either case, the dehumidification control must open the control circuit on humidity rise above the dehumidification set point.

1. Using Fig. 11, move the two pin DEHUM jumper from the "STD" position to the "DEHUM" position.
2. Remove fan speed tap wire from the "LOW" terminal on the interface fan board (IFB) (See Fig. 11).
3. Determine correct normal cooling fan speed for unit and application. Add the wet coil pressure drop in Table 6 to the system static to determine the correct cooling airflow speed in Table 4 that will deliver the nominal cooling airflow as listed in Table 1 for each size.

   NOTE: If accessory electric heat is installed, the dry airflow must meet or exceed the minimum airflow speed specified in Table 2 for the specific size unit. The electric heat fan speed will be the same as the normal cooling fan speed.
4. Remove the vinyl cap off of the desired speed tap wire (Refer to Table 3 for color coding) for the normal cooling fan speed and place desired speed tap wire on "HIGH" on the interface board.
5. Refer to airflow tables (Table 4) to determine allowable speeds for the dehumidification cooling fan speed. In Table 4, speeds that are not allowed for dehumidification cooling are shaded.
6. Remove the vinyl cap off of the desired speed tap wire (Refer to Table 3 for color coding) for the dehumidification cooling fan speed and place desired speed tap wire on the "LOW" connection on the interface board (IFB). Verify that static pressure is in the acceptable range for the speed tap to be used for dehumidification cooling.
7. Use any spare vinyl plugs to cap any unused speed tap wires.



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Fig. 11 – Interface Fan Board (IFB)

SINGLE SPEED COOLING WITH HIGHER ELECTRIC HEAT SPEED

This unit can also be configured to operate with single speed cooling and a higher speed for an accessory electric heater.

1. Using Fig. 11, move the two pin DEHUM jumper from the "STD" position to the "DEHUM" position.
2. See Table 2 for minimum airflow for electric heat operation. Add electric heater and filter pressure drop to duct system static pressure to determine total external static pressure.
3. Select speed tap from Table 4 that will achieve required airflow from Table 2.
4. Remove the vinyl cap off of the desired speed tap wire (Refer to Table 3 for color coding).
5. Connect the desired speed tap wire to the "HIGH" terminal on the interface fan board (IFB).

⚠ CAUTION

UNIT OPERATION HAZARD

Failure to follow this caution may result in unit component damage or improper operation.

To use this mode, a speed connection must be made on the "HIGH" terminal that meets or exceeds the minimum airflow found in Table 2.

Table 3 – Color Coding for Indoor Fan Motor Leads

Black = High Speed
Orange = Med-High Speed
Red = Med Speed
Pink = Med-Low Speed
Blue = Low Speed

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

Disconnect electrical power to the unit and install lockout tag before changing blower speed.

CONTINUOUS FAN OPERATION

When the DEHUM feature is not used, the continuous fan speed will be the same as cooling fan speed. When the DEHUM feature is used, the continuous fan will operate on IFB "LOW" speed when the DH control lead is not energized, or IFB "HIGH" speed when the DH lead is energized (see Fig. 11).

COOLING SEQUENCE OF OPERATION

With the room thermostat SYSTEM switch in the COOL position and the FAN switch in the AUTO position, the cooling sequence of operation is as follows:

When the room temperature rises to a point that is slightly above the cooling control setting of the thermostat, the thermostat completes the circuit between thermostat terminal R to terminals Y and G. These completed circuits through the thermostat connect contactor coil (C) (through unit wire Y) and time delay relay (TDR) (through unit wire G) across the 24-V secondary of transformer (TRAN).

The normally open contacts of energized contactor (C) close and complete the circuit through compressor motor (COMP) to condenser (outdoor) fan motor (OFM). Both motors start instantly.

A set of normally open contacts on the interface fan board (IFB) are closed which energizes a circuit to the indoor fan motor (IFB).

NOTE: Once the compressor has started and then has stopped, it should not be started again until 5 minutes have elapsed.

The cooling cycle remains on until the room temperature drops to a point that is slightly below the cooling control setting of the room thermostat. At this point, the thermostat breaks the circuit between thermostat terminal R to terminals Y and G. These open circuits deenergize contactor coil C and IFB. The condenser and compressor motors stop. After a 90-second delay, the blower motor stops. The unit is in a standby condition, waiting for the next call for cooling from the room thermostat.

Table 4 – Dry Coil Air Delivery* - Horizontal Discharge - Unit 50VL-A24-60

UNIT	MOTOR SPEED	WIRE COLOR		EXTERNAL STATIC PRESSURE (IN. W.C.)								
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
50VL-A24	Low	Blue	CFM	754	650	538	429	---	---	---	---	---
	Med-Low	Pink	CFM	851	777	675	591	475	---	---	---	---
	Medium[1]	Red	CFM	941	851	774	684	576	479	---	---	---
	Med-High	Orange	CFM	1009	917	840	759	667	577	447	---	---
	High	Black	CFM	1241	1167	1111	1036	969	881	818	731	640
50VL-A30	Low	Blue	CFM	741	638	547	415	---	---	---	---	---
	Med-Low	Pink	CFM	973	887	823	733	665	538	451	---	---
	Medium	Red	CFM	1088	1023	954	881	800	723	658	563	461
	Med-High[1]	Orange	CFM	1140	1064	996	915	840	758	687	564	480
	High	Black	CFM	1202	1140	1082	1015	961	881	810	732	631
50VL-A36	Low	Blue	CFM	1234	1168	1093	1021	961	894	825	759	687
	Med-Low	Pink	CFM	1290	1223	1154	1090	1027	977	894	828	762
	Medium[1]	Red	CFM	1354	1290	1226	1158	1102	1046	981	918	843
	Med-High	Orange	CFM	1606	1546	1489	1430	1371	1316	1258	1208	1140
	High	Black	CFM	1630	1580	1517	1463	1407	1339	1277	1210	1131
50VL-A42	Low	Blue	CFM	1295	1234	1182	1126	1075	1016	955	898	857
	Med-Low	Pink	CFM	1345	1282	1235	1194	1140	1095	1027	974	921
	Medium	Red	CFM	1505	1452	1413	1358	1323	1282	1234	1169	1130
	Med-High[1]	Orange	CFM	1545	1492	1449	1411	1362	1313	1278	1231	1188
	High	Black	CFM	1705	1643	1607	1568	1518	1483	1448	1404	1360
50VL-A48	Low	Blue	CFM	1402	1351	1311	1263	1224	1172	1136	1080	1041
	Med-Low	Pink	CFM	1457	1404	1367	1318	1284	1233	1197	1144	1104
	Medium[1]	Red	CFM	1736	1695	1642	1601	1553	1512	1465	1427	1381
	Med-High	Orange	CFM	2149	2111	2062	2026	1980	1945	1905	1864	1793
	High	Black	CFM	2344	2306	2259	2203	2141	2070	1991	1902	1803
50VL-A60	Med-Low	Pink	CFM	1678	1635	1602	1558	1513	1474	1438	1404	1349
	Medium[1]	Red	CFM	1962	1915	1880	1843	1794	1753	1711	1675	1628
	Med-High	Orange	CFM	2131	2088	2065	2013	1982	1941	1888	1860	1785
	High	Black	CFM	2461	2409	2339	2286	2192	2140	2062	1968	1874

* Air delivery values are without air filter and are for dry coil (See Table 6 – 50VL–A Wet Coil Pressure Drop table).

1 Factory–shipped cooling speed

Note: Deduct field–supplied air filter pressure drop and wet coil pressure drop to obtain external static pressure available for ducting.

Shaded areas indicate speed/static combinations that are not permitted for dehumidification speed.

Note: Deduct 10% for 208 volt operation.

Table 5 – Dry Coil Air Delivery - Downflow Discharge

UNIT	MOTOR SPEED	WIRE COLOR	EXTERNAL STATIC PRESSURE (IN W.C.)									
			0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
50VL–A24	High	Black	1050	1000	950	900	850	-	-	-	-	-
50VL–A30	High	Black	1050	1000	950	900	850	-	-	-	-	-
50VL–A36	High	Black	1615	1555	1495	1435	1375	1320	1260	1200	1140	-
50VL–A42	High	Black	1775	1710	1670	1630	1580	1540	1505	1460	1415	-
50VL–A48	High	Black	2505	2440	2345	2295	2215	2120	2040	1990	1750	-
50VL–A60	High	Black	2530	2445	2380	2325	2250	2155	2080	1965	1880	-

Table 6 – 50VL-A Horizontal and Downflow Discharge Wet Coil Pressure Drop (IN. W.C.)

UNIT SIZE	STANDARD CFM (SCFM)																
	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200
24	0.030	0.037	0.044	0.053	0.063	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	0.053	0.063	0.072	0.081	0.105	-	-	-	-	-	-	-	-	-
36	-	-	-	0.055	0.060	0.090	0.100	0.110	0.140	-	-	-	-	-	-	-	-
42	-	-	-	-	0.045	0.050	0.060	0.065	0.075	0.080	0.090	0.094	0.110	-	-	-	-
48	-	-	-	-	-	-	0.041	0.063	0.085	0.100	0.104	0.110	0.120	0.130	0.140	-	-
60	-	-	-	-	-	-	-	-	-	0.060	0.065	0.007	0.077	0.085	0.100	0.115	0.125

Table 7 – Horizontal and Downflow Economizer with 1-in. Filter Pressure Drop (IN. W.C.)

DOWNFLOW ECONOMIZER + INCLUDED FILTERS	COOLING TONS	STANDARD CFM (SCFM)																
		600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200
600-1400 cfm (12x20x1+12x20x1)	2.0, 2.5, 3.0	0.07	0.08	0.10	0.14	0.17	0.21	0.25	0.31	0.35	-	-	-	-	-	-	-	-
1200-1800 cfm (16x24x1+14x24x1)	3.5, 4.0	-	-	-	-	-	-	0.10	0.12	0.13	0.15	0.17	0.19	0.22	-	-	-	-
1500-2200 cfm (16x24x1+18x24x1)	5.0	-	-	-	-	-	-	-	-	-	0.10	0.12	0.13	0.15	0.17	0.18	0.20	0.23

Table 8 – Horizontal and Downflow Filter Pressure Drop Table (IN. W.C.)

FILTER SIZE in. (mm)	COOLING TONS	STANDARD CFM (SCFM)																
		600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200
600-1400 cfm (12x20x1+12x20x1)	2.0, 2.5, 3.0	0.05	0.07	0.08	0.09	0.10	0.11	0.13	0.14	0.15	-	-	-	-	-	-	-	-
1200-1800 cfm (16x24x1+14x24x1)	3.5, 4.0	-	-	-	-	-	-	0.07	0.08	0.09	0.10	0.11	0.11	0.12	-	-	-	-
1500-2200 cfm (16x24x1+18x24x1)	5.0	-	-	-	-	-	-	-	-	-	0.08	0.10	0.10	0.11	0.12	0.13	0.14	0.15

Table 9 – Electric Heat Pressure Drop Tables (IN. W.C.)

Small Cabinet: 24-36

STATIC	STANDARD CFM (SCFM)											
	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
5 kW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.04	0.06	0.07
10 kW	0.00	0.00	0.00	0.00	0.00	0.02	0.04	0.06	0.07	0.09	0.10	0.11
15 kW	0.00	0.00	0.00	0.02	0.04	0.06	0.08	0.10	0.12	0.14	0.16	0.18
20 kW	0.00	0.00	0.02	0.04	0.06	0.08	0.09	0.11	0.13	0.15	0.17	0.19

Large Cabinet: 42-60

STATIC	STANDARD CFM (SCFM)														
	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500
5 kW	0.00	0.00	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12
10 kW	0.00	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13
15 kW	0.00	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
20 kW	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16

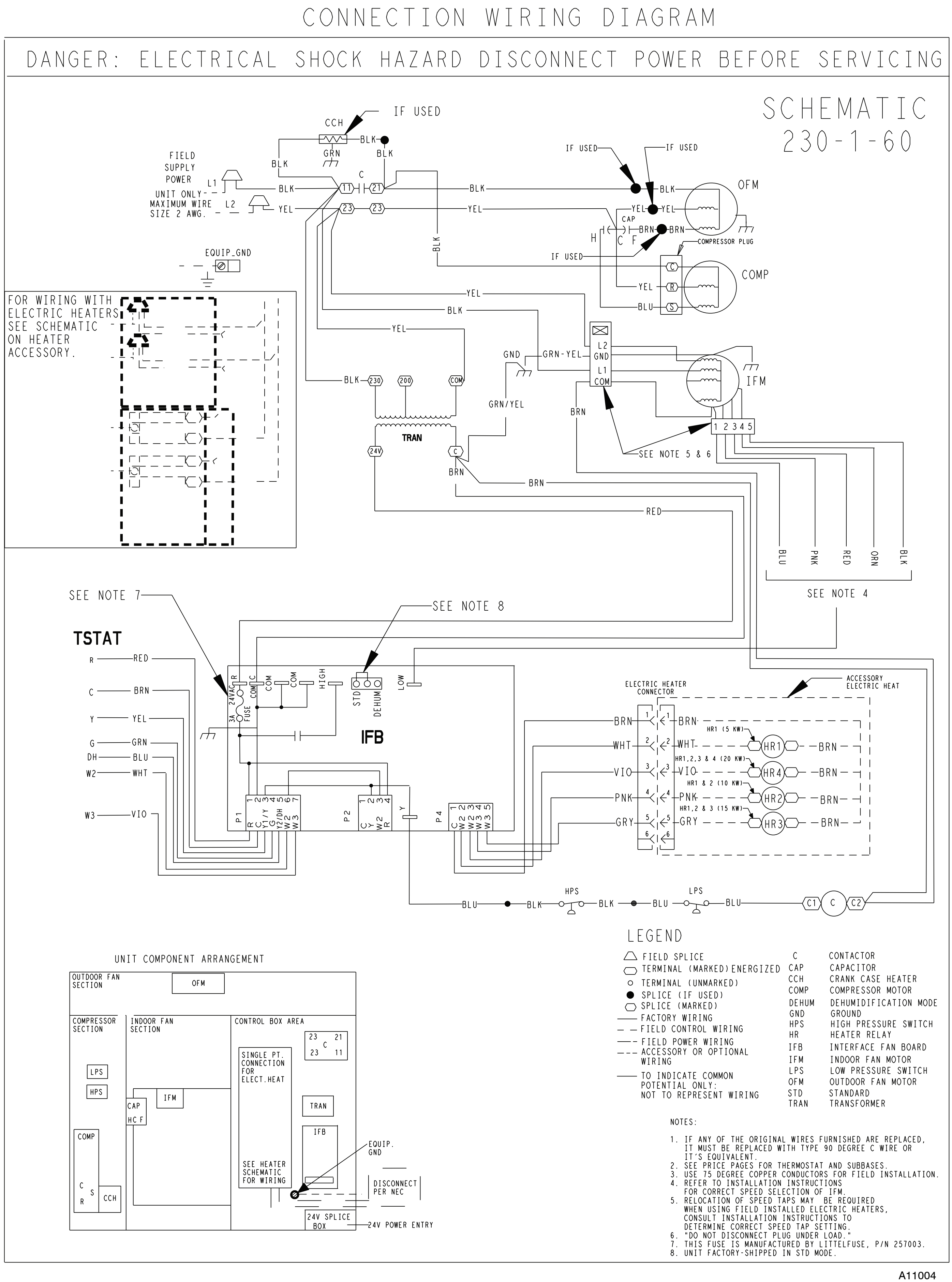


Fig. 12 – Connection Wiring Diagram 208/230-1-60

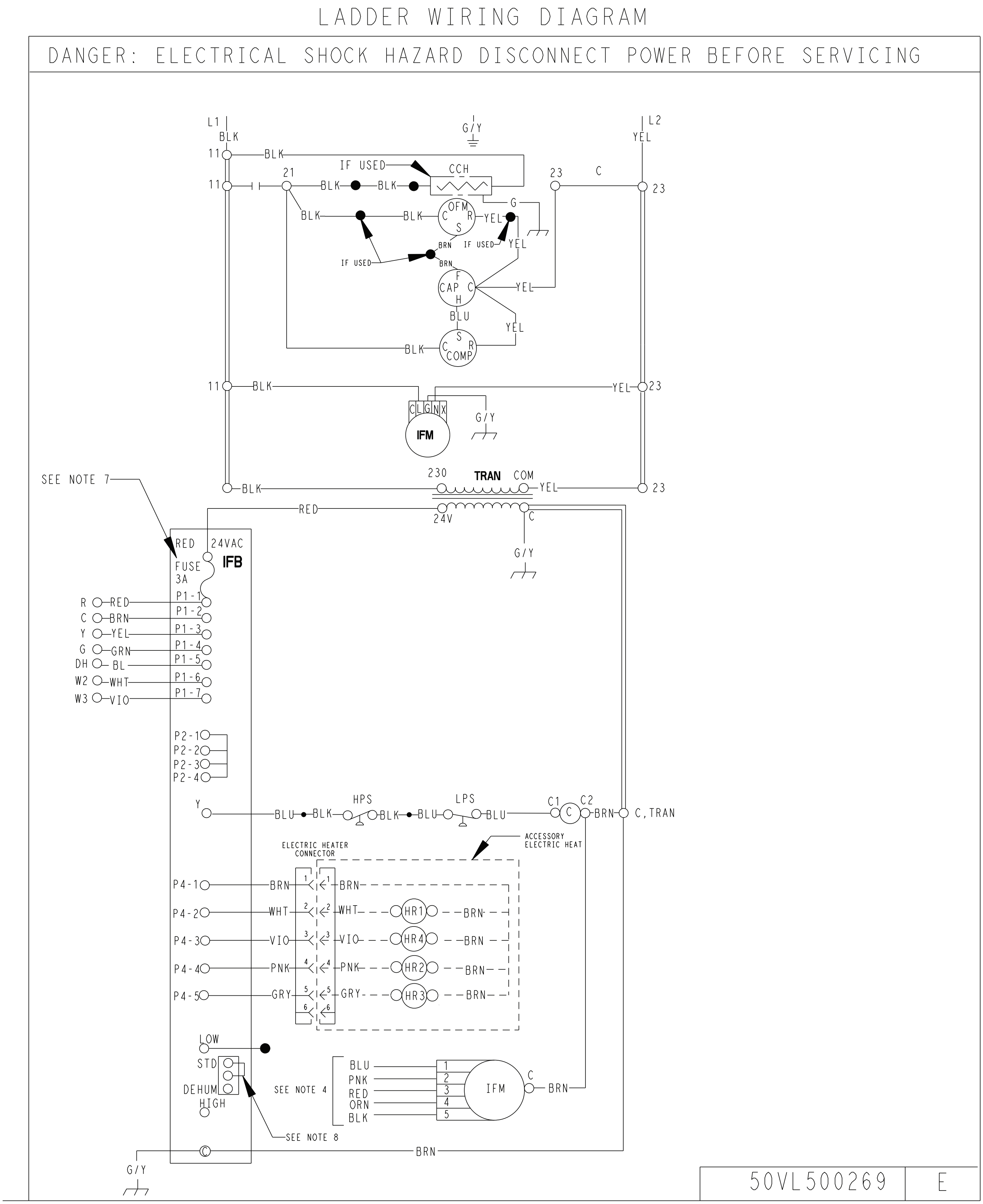
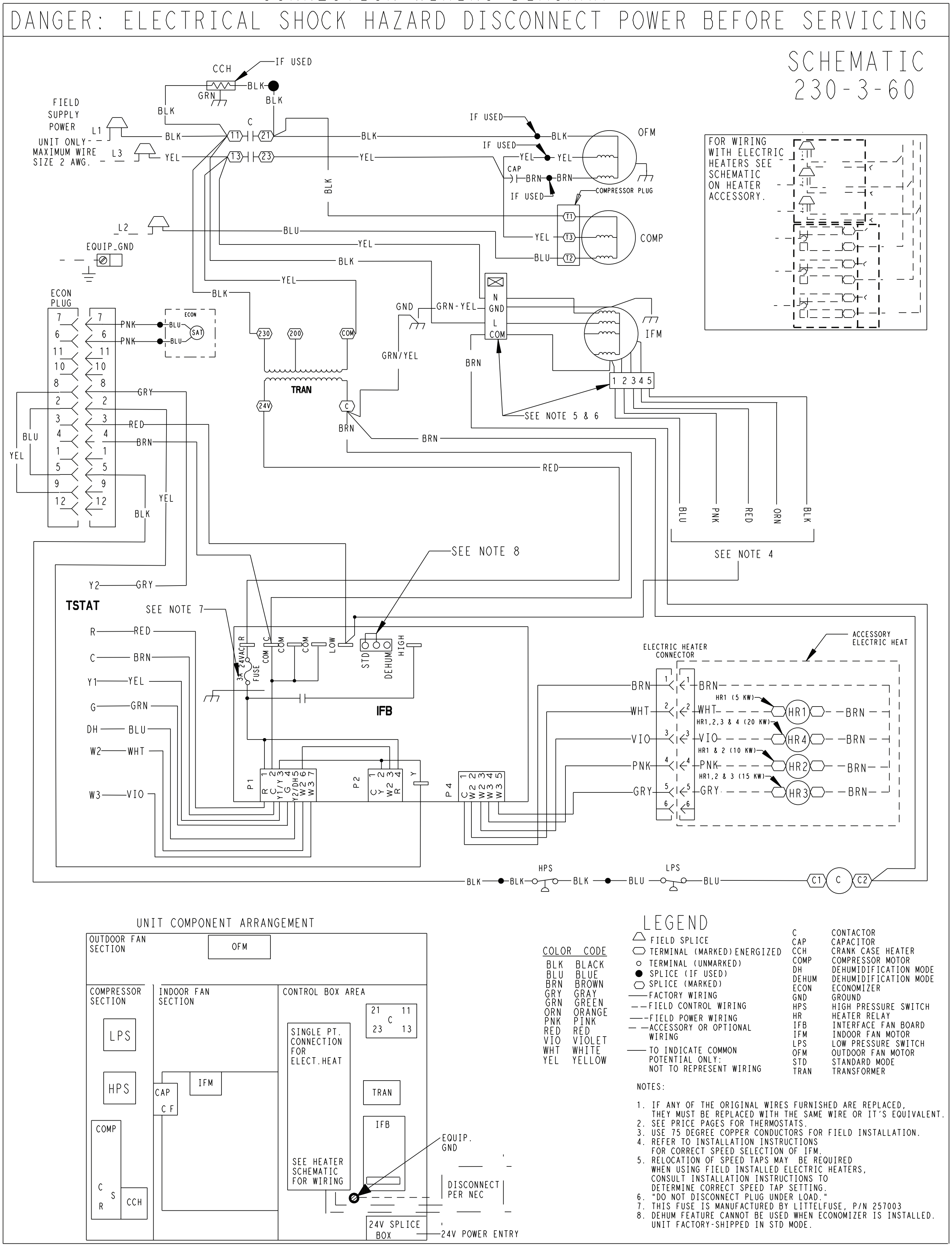


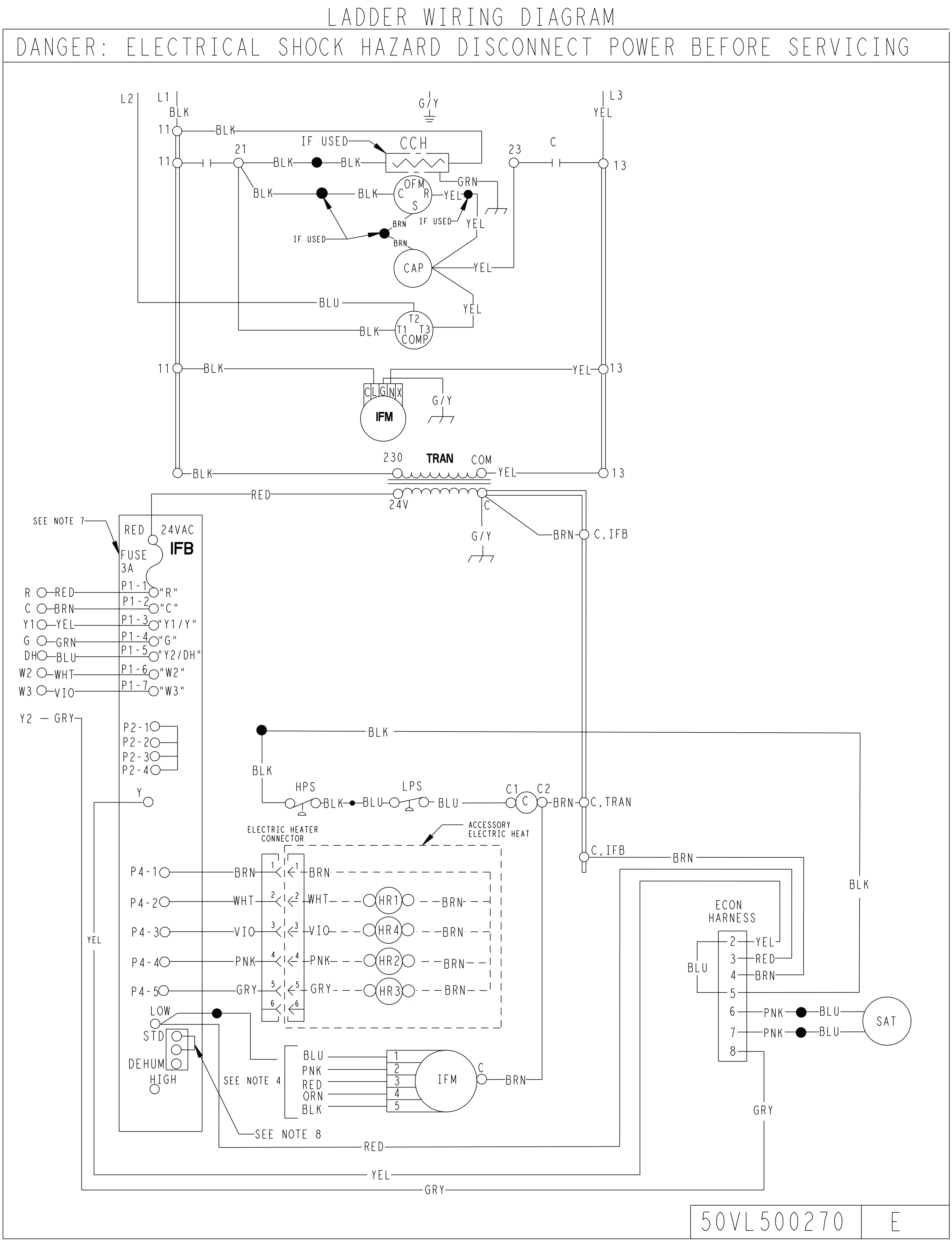
Fig. 12 Cont. - Ladder Wiring Diagram 208/230-1-60

CONNECTION WIRING DIAGRAM



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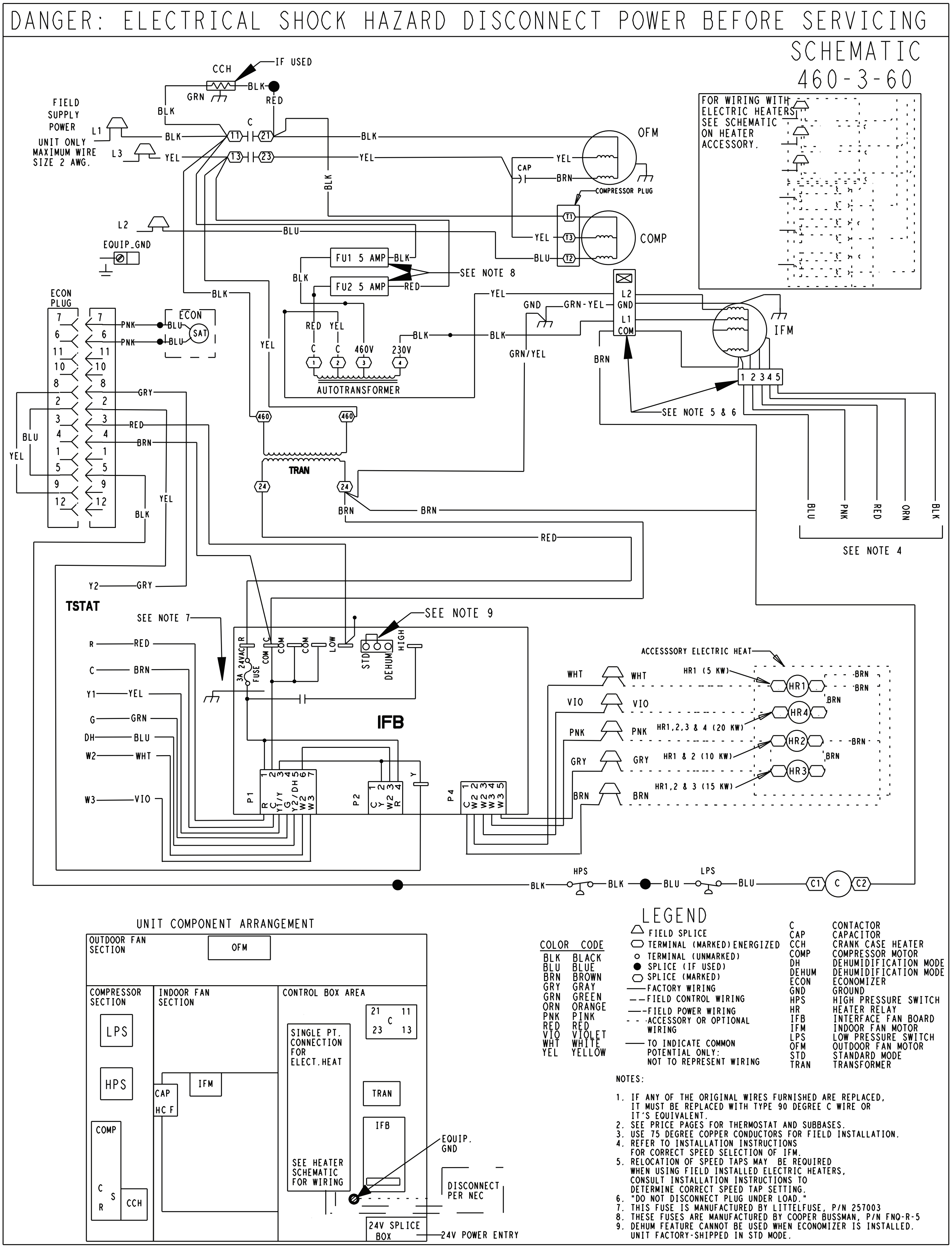
Fig. 13 - Connection Wiring Diagram 208/230-3-60



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Fig. 13 Cont. - Ladder Wiring Diagram 208/230-3-60

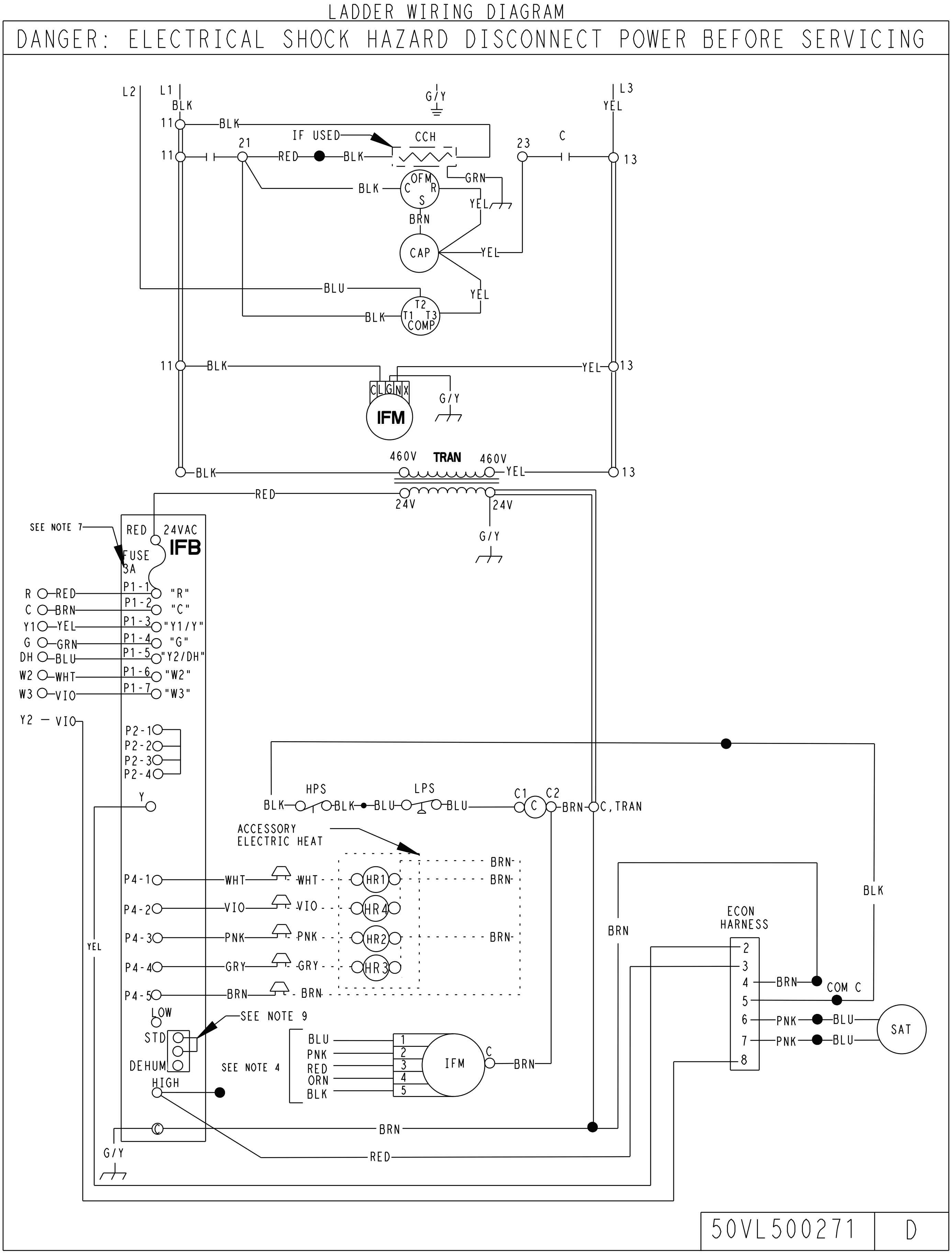
CONNECTION WIRING DIAGRAM



A10204C

Fig. 14 - Connection Wiring Diagram 460-3-60

50VL-A



A10204

Fig. 14 Cont. - Ladder Wiring Diagram 460-3-60

Model Size	Required Subcooling °F(°C)				
	Outdoor Ambient Temperature °F(°C)				
	75 (24)	85 (29)	95 (35)	105 (41)	115 (46)
024	16 (9.1)	16 (9.1)	16 (9.1)	17 (9.5)	18 (9.9)
030	10 (5.6)	10 (5.6)	10 (5.6)	10 (5.6)	10 (5.6)
036	15 (8.4)	15 (8.2)	14 (8)	14 (7.7)	13 (7.5)
042	14 (7.8)	14 (7.8)	14 (7.8)	12 (6.9)	11 (6.4)
048	17 (9.4)	16 (9)	15 (8.6)	15 (8.1)	14 (7.5)
060	18 (9.9)	17 (9.5)	17 (9.3)	15 (8.6)	14 (8)

Charging Procedure

1- Measure Discharge line pressure by attaching a gauge to the service port.

2- Measure the Liquid line temperature by attaching a temperature sensing device to it.

3- Insulate the temperature sensing device so that the Outdoor Ambient doesn't affect the reading.

4- Refer to the required Subcooling in the table based on the model size and the Outdoor Ambient temperature.

5- Interpolate if the Outdoor ambient temperature lies in between the table values.

6- Find the Pressure Value in the table corresponding to the the measured Pressure of the Compressor Discharge line.

7- Read across from the Pressure reading to obtain the Liquid line temperature for a required Subcooling

8- Add Charge if the measured temperature is higher than the table value.

9 - Remove charge if the measured temperature is lower than the table value.

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Required Liquid Line Temperature for a Specific Subcooling (R-410A)

Pressure (psig)	Required Subcooling (°F) 5	10	15	20	25	Pressure (kPa)	Required Subcooling (°C) 3	6	8	11	14
189	61	56	51	46	41	1303	16	13	11	8	5
196	63	58	53	48	43	1351	17	15	12	9	6
203	66	61	56	51	46	1399	19	16	13	10	8
210	68	63	58	53	48	1448	20	17	14	11	9
217	70	65	60	55	50	1496	21	18	15	13	10
224	72	67	62	57	52	1544	22	19	16	14	11
231	74	69	64	59	54	1593	23	20	18	15	12
238	76	71	66	61	56	1641	24	21	19	16	13
245	77	72	67	62	57	1689	25	22	20	17	14
252	79	74	69	64	59	1737	26	23	21	18	15
260	81	76	71	66	61	1792	27	25	22	19	16
268	83	78	73	68	63	1848	29	26	23	20	17
276	85	80	75	70	65	1903	30	27	24	21	19
284	87	82	77	72	67	1958	31	28	25	22	20
292	89	84	79	74	69	2013	32	29	26	23	21
300	91	86	81	76	71	2068	33	30	27	24	22
309	93	88	83	78	73	2130	34	31	28	26	23
318	95	90	85	80	75	2192	35	32	29	27	24
327	97	92	87	82	77	2254	36	33	31	28	25
336	99	94	89	84	79	2316	37	34	32	29	26
345	101	96	91	86	81	2378	38	35	33	30	27
354	103	98	93	88	83	2440	39	36	34	31	28
364	105	100	95	90	85	2509	40	38	35	32	29
374	107	102	97	92	87	2578	41	39	36	33	30
384	108	103	98	93	88	2647	42	40	37	34	31
394	110	105	100	95	90	2716	44	41	38	35	32
404	112	107	102	97	92	2785	45	42	39	36	33
414	114	109	104	99	94	2854	46	43	40	37	34
424	116	111	106	101	96	2923	47	44	41	38	35
434	118	113	108	103	98	2992	48	45	42	39	36
444	119	114	109	104	99	3061	48	46	43	40	37
454	121	116	111	106	101	3130	49	47	44	41	38
464	123	118	113	108	103	3199	50	48	45	42	39
474	124	119	114	109	104	3268	51	48	46	43	40
484	126	121	116	111	106	3337	52	49	47	44	41
494	127	122	117	112	107	3406	53	50	47	45	42
504	129	124	119	114	109	3475	54	51	48	46	43
514	131	126	121	116	111	3544	55	52	49	46	44
524	132	127	122	117	112	3612	56	53	50	47	45
534	134	129	124	119	114	3681	56	54	51	48	45

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Fig. 15 - Cooling Charging Chart

MAINTENANCE

To ensure continuing high performance, and to minimize the possibility of premature equipment failure, periodic maintenance must be performed on this equipment. This cooling unit should be inspected at least once each year by a qualified service person. To troubleshoot unit, refer to Table 8, Troubleshooting Chart.

NOTE TO EQUIPMENT OWNER: Consult your local dealer about the availability of a maintenance contract.

⚠ WARNING

PERSONAL INJURY AND UNIT DAMAGE HAZARD

Failure to follow this warning could result in personal injury or death and possible unit component damage.

The ability to properly perform maintenance on this equipment requires certain expertise, mechanical skills, tools and equipment. If you do not possess these, do not attempt to perform any maintenance on this equipment, other than those procedures recommended in the Owner's Manual.

⚠ WARNING

ELECTRICAL SHOCK AND FIRE HAZARD

Failure to follow these warnings could result in personal injury or death:

1. Turn off electrical power to the unit and install lockout tag before performing any maintenance or service on this unit.
2. Use extreme caution when removing panels and parts.
3. Never place anything combustible either on or in contact with the unit.

⚠ CAUTION

UNIT OPERATION HAZARD

Failure to follow this caution may result in equipment damage or improper operation.

Errors made when reconnecting wires may cause improper and dangerous operation. Label all wires prior to disconnecting when servicing.

The minimum maintenance requirements for this equipment are as follows:

1. Inspect air filter(s) each month. Clean or replace when necessary.
2. Inspect indoor coil, drain pan, and condensate drain each cooling season for cleanliness. Clean when necessary.
3. Inspect blower motor and wheel for cleanliness each cooling season. Clean when necessary.
4. Check electrical connections for tightness and controls for proper operation each cooling season. Service when necessary.
5. Ensure electric wires are not in contact with refrigerant tubing or sharp metal edges.

Air Filter

IMPORTANT: Never operate the unit without a suitable air filter in the return-air duct system. Always replace the filter with the same dimensional size and type as originally installed. See Table 1 for recommended filter sizes.

Inspect air filter(s) at least once each month and replace (throwaway-type) or clean (cleanable-type) at least twice during each cooling season and twice during the heating season, or whenever the filter becomes clogged with dust and lint.

Indoor Blower and Motor

NOTE: All motors are pre-lubricated. Do not attempt to lubricate these motors.

For longer life, operating economy, and continuing efficiency, clean accumulated dirt and grease from the blower wheel and motor annually.

⚠ WARNING

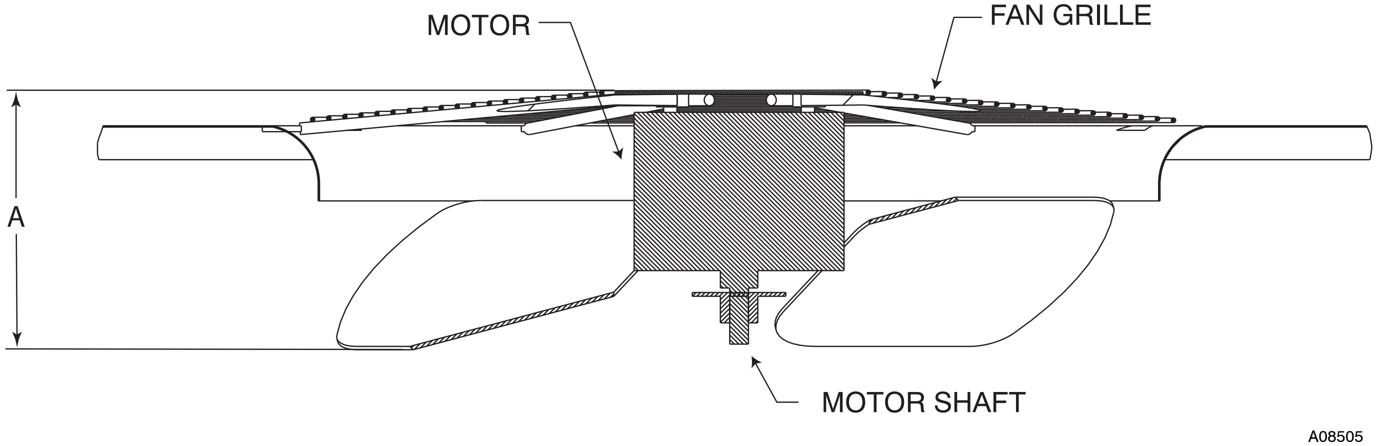
ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

Disconnect and tag electrical power to the unit before cleaning the blower motor and wheel.

To clean the blower motor and wheel:

1. Remove and disassemble blower assembly as follows:
   a. Remove blower access panel (see Fig. 17).
   b. Disconnect 5 pin plug and 4 pin plug from indoor blower motor. Remove capacitor if required.
   c. On all units remove blower assembly from unit. Remove screws securing blower to blower partition and slide assembly out. Be careful not to tear insulation in blower compartment.
   d. Ensure proper reassembly by marking blower wheel and motor in relation to blower housing before disassembly.
   e. Loosen setscrew(s) that secures wheel to motor shaft, remove screws that secure motor mount brackets to housing, and slide motor and motor mount out of housing.
2. Remove and clean blower wheel as follows:
   a. Ensure proper reassembly by marking wheel orientation.
   b. Lift wheel from housing. When handling and/or cleaning blower wheel, be sure not to disturb balance weights (clips) on blower wheel vanes.
   c. Remove caked-on dirt from wheel and housing with a brush. Remove lint and/or dirt accumulations from wheel and housing with vacuum cleaner, using soft brush attachment. Remove grease and oil with mild solvent.
   d. Reassemble wheel into housing.
   e. Reassemble motor into housing. Be sure setscrews are tightened on motor shaft flats and not on round part of shaft. Reinstall blower into unit.
   f. Connect 5 pin plug and 4 pin plug to indoor blower motor. Reinstall capacitor if required.
   g. Reinstall blower access panel (see Fig. 17).
3. Restore electrical power to unit. Start unit and check for proper blower rotation and motor speeds during cooling cycles.



MAX DISTANCE BETWEEN TOP OF FAN GRILLE AND BOTTOM OF FAN BLADE

SIZE	"A"	
	IN.	MM
24	6.3	160
30	6.3	160
36	7.3	185
42	7.6	193
48	7.6	193
60	7.6	193

Fig. 16 - Fan Blade Position

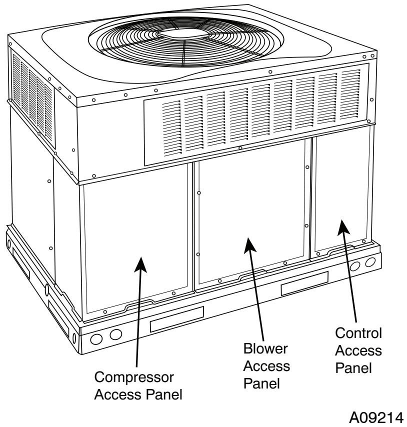


Fig. 17 - Unit Access Panels

Outdoor Coil, Indoor Coil, and Condensate Drain Pan

Inspect the condenser coil, evaporator coil, and condensate drain pan at least once each year.

The coils are easily cleaned when dry; therefore, inspect and clean the coils either before or after each cooling season. Remove all obstructions, including weeds and shrubs, that interfere with the airflow through the condenser coil.

Straighten bent fins with a fin comb. If coated with dirt or lint, clean the coils with a vacuum cleaner, using the soft brush attachment. Be careful not to bend the fins. If coated with oil or grease, clean the coils with a mild detergent and water solution. Rinse coils with clear water, using a garden hose. Be careful not to splash water on motors, insulation, wiring, or air filter(s). For best results, spray condenser coil fins from inside to outside the unit. On units with an outer and inner condenser coil, be sure to clean between the coils. Be sure to flush all dirt and debris from the unit base.

Inspect the drain pan and condensate drain line when inspecting the coils. Clean the drain pan and condensate drain by removing all foreign matter from the pan. Flush the pan and drain trough with clear water. Do not splash water on the insulation, motor, wiring, or air filter(s). If the drain trough is restricted, clear it with a "plumbers snake" or similar probe device.

OUTDOOR FAN

⚠ CAUTION

UNIT OPERATION HAZARD

Failure to follow this caution may result in damage to unit components.

Keep the condenser fan free from all obstructions to ensure proper cooling operation. Never place articles on top of the unit.

1. Remove 6 screws holding condenser grille and motor to top cover.
2. Turn motor/grille assembly upside down on top cover to expose the fan blade.
3. Inspect the fan blades for cracks or bends.
4. If fan needs to be removed, loosen the setscrew and slide the fan off the motor shaft.
5. When replacing fan blade, position blade as shown in Fig. 16.
6. Ensure that setscrew engages the flat area on the motor shaft when tightening
7. Replace grille.

Electrical Controls and Wiring

Inspect and check the electrical controls and wiring annually. Be sure to turn off the electrical power to the unit.

Remove access panels (see Fig. 17) to locate all the electrical controls and wiring. Check all electrical connections for tightness. Tighten all screw connections. If any smoky or burned connections are noticed, disassemble the connection, clean all the parts, restrip the wire end and reassemble the connection properly and securely.

After inspecting the electrical controls and wiring, replace the access panels (see Fig. 17). Start the unit, and observe at least one complete heating cycle and one complete cooling cycle to ensure proper operation. If discrepancies are observed in either or both operating cycles, or if a suspected malfunction has occurred, check

each electrical component with the proper electrical instrumentation. Refer to the unit wiring label when making these checkouts.

NOTE: Refer to the heating and/or cooling sequence of operation in this publication as an aid in determining proper control operation

Refrigerant Circuit

Inspect all refrigerant tubing connections and the unit base for oil accumulations annually. Detecting oil generally indicates a refrigerant leak.

> **⚠ WARNING**
>
> **EXPLOSION, SAFETY AND ENVIRONMENTAL HAZARD**
>
> Failure to follow this warning could result in personal injury, death or equipment damage.
>
> This system uses Puron (R-410A) refrigerant which has higher operating pressures than R-22 and other refrigerants. No other refrigerant may be used in this system. Gauge set, hoses, and recovery system must be designed to handle Puron. If you are unsure, consult the equipment manufacturer.

If oil is detected or if low cooling performance is suspected, leak-test all refrigerant tubing using an electronic leak-detector, halide torch, or liquid-soap solution. If a refrigerant leak is detected, refer to Check for Refrigerant Leaks section.

If no refrigerant leaks are found and low cooling performance is suspected, refer to Checking and Adjusting Refrigerant Charge section.

Evaporator Airflow

The heating and/or cooling air-flow does not require checking unless improper performance is suspected. If a problem exists, be sure that all supply- and return-air grilles are open and free from obstructions, and that the air filter is clean. When necessary, refer to Indoor Airflow and Airflow Adjustments section to check the system airflow.

Puron Items

The indoor metering device is a TXV type device.

Pressure Switches

Pressure switches are protective devices wired into the control circuit (low voltage). They shut off compressor if abnormally high or low pressures are present in the refrigeration circuit. These pressure switches are specifically designed to operate with Puron (R-410A) systems. R-22 pressure switches must not be used as replacements for the Puron (R-410A) air conditioner.

Loss of Charge/Low-Pressure Switch (Air Conditioner Only)

This switch is located on the liquid line and protects against low suction pressures caused by such events as loss of charge, low airflow across indoor coil, dirty filters, etc. It opens on a pressure drop at about 20 psig (957 Pa). If system pressure is above this, switch should be closed.

To check switch:

1. Turn off all power to unit.
2. Disconnect leads on switch.
3. Apply ohmmeter leads across switch. You should have continuity on a good switch.

NOTE: Because these switches are attached to refrigeration system under pressure, it is not advisable to remove this device for troubleshooting unless you are reasonably certain that a problem exists. If switch must be removed, remove and recover all system charge so that pressure gauges read 0 psi (0 Pa). Never open system without breaking vacuum with dry nitrogen.

High-Pressure Switch

The high-pressure switch is located in the discharge line and protects against excessive condenser coil pressure. It opens at 650 psig (31.1 kPa). High pressure may be caused by a dirty condenser coil, failed fan motor, or condenser air recirculation.

To check switch:

1. Turn off all power to unit.
2. Disconnect leads on switch.
3. Apply ohmmeter leads across switch. You should have continuity on a good switch.

Copeland Scroll Compressor (Puron Refrigerant)

The compressor used in this product is specifically designed to operate with Puron (R-410A) refrigerant and cannot be interchanged.

The compressor is an electrical (as well as mechanical) device. Exercise extreme caution when working near compressors. Power should be shut off, if possible, for most troubleshooting techniques. Refrigerants present additional safety hazards.

> **⚠ WARNING**
>
> **FIRE/EXPLOSION HAZARD**
>
> Failure to follow this warning could result in personal injury or death and/or property damage.
>
> Wear safety glasses and gloves when handling refrigerants. Keep torches and other ignition sources away from refrigerants and oils.

The scroll compressor pumps refrigerant throughout the system by the interaction of a stationary and an orbiting scroll. The scroll compressor has no dynamic suction or discharge valves, and it is more tolerant of stresses caused by debris, liquid slugging, and flooded starts. The compressor is equipped with a noise reducing shutdown device and an internal pressure relief port. The pressure relief port is a safety device, designed to protect against extreme high pressure. The relief port has an operating range between 550 (26.3 kPa) and 625 (29.9 kPa) psig differential pressure.

Refrigerant

> **⚠ WARNING**
>
> **EXPLOSION, ENVIRONMENTAL HAZARD**
>
> Failure to follow this warning could result in personal injury, death or equipment damage.
>
> This system uses Puron (R-410A) refrigerant which has higher operating pressures than R-22 and other refrigerants. No other refrigerant may be used in this system. Gauge set, hoses, and recovery system must be designed to handle Puron. If you are unsure, consult the equipment manufacturer.

This system uses Puron (R-410A) refrigerant which has higher operating pressures than R-22 and other refrigerants. No other refrigerant may be used in this system. Gage set, hoses, and recovery system must be designed to handle Puron. If you are unsure, consult the equipment manufacturer. Failure to use Puron compatible servicing equipment or replacement components may result in property damage or injury.

Compressor Oil

The Copeland scroll compressor uses 3MAF POE oil. If additional oil is needed, use Uniqema RL32-3MAF. If this oil is not available, use Copeland Ultra 32 CC or Mobil Arctic EAL22 CC. This oil is extremely hygroscopic, meaning it absorbs water

readily. POE oils can absorb 15 times as much water as other oils designed for HCFC and CFC refrigerants. Take all necessary precautions to avoid exposure of the oil to the atmosphere.

Servicing Systems on Roofs with Synthetic Materials

POE (polyolester) compressor lubricants are known to cause long term damage to some synthetic roofing materials. Exposure, even if immediately cleaned up, may cause embrittlement (leading to cracking) to occur in one year or more. When performing any service that may risk exposure of compressor oil to the roof, take appropriate precautions to protect roofing. Procedures which risk oil leakage include, but are not limited to, compressor replacement, repairing refrigerant leaks, replacing refrigerant components such as filter drier, pressure switch, metering device, coil, accumulator, or reversing valve.

Synthetic Roof Precautionary Procedure

1. Cover extended roof working area with an impermeable polyethylene (plastic) drip cloth or tarp. Cover an approximate 10 x 10 ft (3 x 3 m) area.
2. Cover area in front of the unit service panel with a terry cloth shop towel to absorb lubricant spills, prevent run-offs, and protect drop cloth from tears caused by tools or components.
3. Place terry cloth shop towel inside unit immediately under component(s) to be serviced and prevent lubricant run-offs through the louvered openings in the unit base.
4. Perform required service.
5. Remove and dispose of any oil contaminated material per local codes.

Liquid Line Filter Drier

The filter drier is specifically designed to operate with Puron. Use only factory-authorized components. Filter drier must be replaced whenever the refrigerant system is opened. When removing a filter drier, use a tubing cutter to cut the drier from the system. Do not unsweat a filter drier from the system. Heat from unsweating will release moisture and contaminants from drier into system.

Puron (R-410A) Refrigerant Charging

Refer to unit information plate and charging chart. Some R-410A refrigerant cylinders contain a dip tube to allow liquid refrigerant to flow from cylinder in upright position. For cylinders equipped with a dip tube, charge Puron units with cylinder in upright position and a commercial metering device in manifold hose. Charge refrigerant into suction-line.

TROUBLESHOOTING

Refer to the Troubleshooting Chart (Table 10) for troubleshooting information.

START-UP CHECKLIST

Use the Start-Up Checklist at the back of this manual.

Table 10 – Troubleshooting Chart

SYMPTOM	CAUSE	REMEDY
Compressor and outdoor fan will not start	Power failure	Call power company
	Fuse blown or circuit breaker tripped	Replace fuse or reset circuit breaker
	Defective contactor, transformer, control relay, or high-pressure, loss-of-charge or low-pressure switch	Replace component
	Insufficient line voltage	Determine cause and correct
	Incorrect or faulty wiring	Check wiring diagram and rewire correctly
	Thermostat setting too low/too high	Reset thermostat setting
Compressor will not start but condenser fan runs	Faulty wiring or circuit Loose connections in compressor	Check wiring and repair or replace
	Compressor motor burned out, seized, or internal overload open	Determine cause Replace compressor
	Defective run capacitor, overload, or PTC (positive temperature coefficient) thermistor	Determine cause and replace
	One leg of 3-phase power dead	Replace fuse or reset circuit breaker Determine cause
	Low input voltage	Determine cause and correct
Three-phase scroll compressor (size 30-60 unit) has a low pressure differential	Scroll compressor is rotating in the wrong direction	Correct the direction of rotation by reversing the 3-phase power leads to the unit
Compressor cycles (other than normally satisfying) cooling/heating calls	Refrigerant overcharge or undercharge	Recover refrigerant, evacuate system, and re-charge to capacities shown on rating plate
	Defective compressor	Replace and determine cause
	Insufficient line voltage	Determine cause and correct
	Blocked outdoor coil	Determine cause and correct
	Defective run/start capacitor, overload or start relay	Determine cause and replace
	Faulty outdoor fan motor or capacitor	Replace
	Restriction in refrigerant system	Locate restriction and remove
Compressor operates continuously	Dirty air filter	Replace filter
	Unit undersized for load	Decrease load or increase unit size
	Thermostat temperature set too low	Reset thermostat setting
	Low refrigerant charge	Locate leak, repair, and recharge
	Air in system	Recover refrigerant, evacuate system, and re-charge
	Outdoor coil dirty or restricted	Clean coil or remove restriction
Excessive head pressure	Dirty air filter	Replace filter
	Dirty indoor or outdoor coil	Clean coil
	Refrigerant overcharged	Recover excess refrigerant
	Air in system	Recover refrigerant, evacuate system, and re-charge
	Indoor or outdoor air restricted or air short-cycling	Determine cause and correct
Head pressure too low	Low refrigerant charge	Check for leaks, repair and recharge
	Restriction in liquid tube	Remove restriction
Excessive suction pressure	Refrigerant overcharged	Recover excess refrigerant
Suction pressure too low	Dirty air filter	Replace filter
	Low refrigerant charge	Check for leaks, repair and recharge
	Metering device or low side restricted	Remove source of restriction
	Insufficient coil airflow	Check filter–replace if necessary
	Temperature too low in conditioned area	Reset thermostat setting
	Outdoor ambient below 55°F (13°C)	Install low-ambient kit
	Filter drier restricted	Replace

AIR CONDITIONER WITH PURON (R-410A) QUICK REFERENCE GUIDE

Puron refrigerant operates at 50-70 percent higher pressures than R-22. Be sure that servicing equipment and replacement components are designed to operate with Puron. Puron refrigerant cylinders are rose colored.

- Puron refrigerant cylinders manufactured prior to March 1, 1999, have a dip tube that allows liquid to flow out of cylinder in upright position.
  Cylinders manufactured March 1, 1999 and later DO NOT have a dip tube and MUST be positioned upside down to allow liquid to flow.
- Recovery cylinder service pressure rating must be 400 psig. DOT 4BA400 or DOT BW400.
- Puron systems should be charged with liquid refrigerant. Use a commercial type metering device in the manifold hose.
- Manifold sets should be minimum 700 psig high-side and 180 psig low-side with 550 psig low-side retard.
- Use hoses with minimum 700 psig service pressure rating.
- Leak detectors should be designed to detect HFC refrigerant.
- Puron, as with other HFCs, is only compatible with POE oils.
- Vacuum pumps will not remove moisture from oil.
- Only use factory specified liquid-line filter driers with rated working pressures no less than 600 psig.
- Do not install a suction-line filter drier in liquid line.
- POE oils absorb moisture rapidly. Do not expose oil to atmosphere.
- POE oils may cause damage to certain plastics and roofing materials.
- Wrap all filter driers and service valves with wet cloth when brazing.
- A Puron liquid-line filter drier is required on every unit.
- Do not use an R-22 TXV.
- Never open system to atmosphere while it is under a vacuum.
- When system must be opened for service, break vacuum with dry nitrogen and replace filter driers.
- Always replace filter drier after opening system for service.
- Do not vent Puron into the atmosphere.
- Observe all warnings, cautions, and bold text.
- Do not leave Puron suction line driers in place for more than 72 hrs.

START-UP CHECKLIST

(Remove and Store in Job Files)

I. PRELIMINARY INFORMATION

MODEL NO.:______________________________

SERIAL NO.:______________________________

DATE:__________________________________

TECHNICIAN:_____________________________

II. PRESTART-UP (Insert check mark in box as each item is completed)

( ) VERIFY THAT ALL PACKING MATERIALS HAVE BEEN REMOVED FROM UNIT

( ) REMOVE ALL SHIPPING HOLD DOWN BOLTS AND BRACKETS PER INSTALLATION INSTRUCTIONS

( ) CHECK ALL ELECTRICAL CONNECTIONS AND TERMINALS FOR TIGHTNESS

( ) CHECK THAT INDOOR (EVAPORATOR) AIR FILTER IS CLEAN AND IN PLACE

( ) VERIFY THAT UNIT INSTALLATION IS LEVEL

( ) CHECK FAN WHEEL, AND PROPELLER FOR LOCATION IN HOUSING/ORIFICE AND SETSCREW TIGHTNESS

50VL-A

III. START-UP

ELECTRICAL

SUPPLY VOLTAGE__________________________

COMPRESSOR AMPS________________________

INDOOR (EVAPORATOR) FAN AMPS____________

TEMPERATURES

OUTDOOR (CONDENSER) AIR TEMPERATURE__________DB

RETURN-AIR TEMPERATURE______________DB______________WB

COOLING SUPPLY AIR______________DB__________________WB

PRESSURES

REFRIGERANT SUCTION____________PSIG, SUCTION LINE TEMP*______________

REFRIGERANT DISCHARGE______________PSIG, LIQUID TEMP†______________

( ) VERIFY REFRIGERANT CHARGE USING CHARGING CHARTS

* Measured at suction inlet to compressor

† Measured at liquid line leaving condenser.

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